



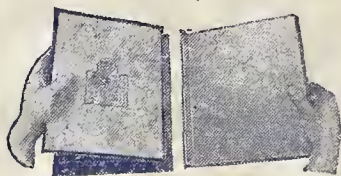
000193955

MISS

G100

P

4012

*Directions for using the Binder.*

1. PLACE BINDER FLAT ON DESK OR TABLE AS SHOWN.
2. PRESS BACK TOP BOARD *with Left Hand* - THIS WILL OPEN THE SPRING BACK & CONTENTS ARE INSERTED OR RELEASED *by Right Hand*.
3. SIDES OR BOARDS *Must Not* BE PULLED APART TO OPEN.

Stocked in the following stock sizes:-

| | | | |
|----------------------|------------------|----------------------|--------------|
| No. 1 Octavo upright | 9½ x 5½ in. | No. 01 Octavo oblong | 5½ x 7½ in. |
| " 2 Quarto upright | 11½ x 8½ in. | " 02 Quarto oblong | 9 x 10½ in. |
| " 3 Foolscap upright | 13¾ x 8 in. | " 03 Foolscap oblong | 8¾ x 12¾ in. |
| No. 4 Music | - - 15 x 10½ in. | | |

Also Obtainable in the following sizes:-

| | | | |
|----------------------|------------------|------------------------|-------------------|
| No. 1a Small Quarto | 10¾ x 6¾ in. | No. 4b Dance Music | 13 x 9½ in. |
| " 2a Gleees | - - 11¾ x 8½ in. | " 5 Large Post Folio | 16½ x 10½ in. |
| " 2b Students Papers | 12 x 9 in. | " 6 Illus. London News | 17 x 11½ in. |
| " 4a "Musical Times" | 11 x 6¾ in. | " 7 Brief | - - 13½ x 15½ in. |
| No. 8 Demy | | | 18 x 12 in. |

REGISTERED **PIONEER** TRADE MARK

ABERRATIONAL AND SUBSPECIFIC FORMS OF BRITISH LEPIDOPTERA

BY

A. L. GOODSON & D. K. READ.

FOR INTERNAL USE ONLY

Volume 4

Rhopalocera Part 4

INDEX

| | | | | | |
|-----------------------------------|-----|----------------------------------|------|-----------------------------------|------|
| apicenudata Vty. | 3. | fasciata Kautz. | 7. | kautzi Gorn. | 3. |
| aurea Mosley. | 2. | flava Ckll. | 2. | | |
| aversomaculata Stach. | 12. | flava Kane. | 4. | | |
| | | flava Klemmn. (of narapae.) | 8. | lachrymosa Thomps. | 6. |
| | | flava Oberth. | 2. | lambella Kautz. | 10. |
| basinigra Harw. | 5. | flavescens Froh. | 2. | lambillioni Dufr. | 6. |
| basiochracea Kautz. | 5. | flavescens Tutt. | 4. | latecincta Müll. | 11. |
| bicolor Müll. | 5. | (flavescens Wagn. | 14.) | lineata Müll. | 7. |
| bimaculata Schim. | 5. | flavicans Müll. | 4. | longomaculata Müll. | 6. |
| bipartita Kromer. | 12. | (flavometa Schima. | 14.) | lutea Oberth. | 2. |
| bipunctata Osth. | 5. | flavopicta Müll. | 11. | | |
| biroi Diosz. | 3. | fountainae Vty. | 13. | | |
| britannica Vty. | 1. | fulgoris Thomps. | 12. | magnomaculata Müll. | 6. |
| | | fumigata Gillm. | 2. | magnonotata Müll. | 5. |
| | | fumosa Thomps. | 2. | marginestixis Dnhi. | 7. |
| carnea Vty. | 1. | fuscosignata Lpke. | 4. | (meta Rbb. | 14.) |
| cincta Car. | 7. | | | (meta Wagn. | 14.) |
| citrona Froh. | 2. | | | minima Musch. | 10. |
| citronella Thomps. | 3. | gorniki Kautz. | 7. | minima Vty. | 10. |
| confluens Schima. | 7. | grisea Sib. | 5. | minor Agassiz. | 10. |
| conjuncta Lpke. | 6. | griseopicta Müll. (Vty. n. nud.) | 5. | minor Crombr. | 10. |
| conjuncta Müll. (Vty. nom. nud.) | 7. | | | mülleri Diosz. | |
| continua Bryk. | 7. | | | | |
| cuneata Müll. | 7. | headi Neschn. | 3. | | |
| | | henrici Oberth. | 11. | nana Finke. | 10. |
| | | heptopotamica Krul. | 8. | nana Rbb. | 4. |
| deficiens Rocci. | 13. | hibernica Schmidt. | 2. | nanella Strand. | 10. |
| destrigata Müll. | 4. | | | napaeae Esp. | 1. |
| detersa Müll. | 3. | | | napae-divisa Pionn. | 8. |
| divisa Lpke. | 8. | immaculata Strand. | 4. | napella Lamb. | 10. |
| divisa Pionn. | | impleta Thomps. | 6. | napi Linn. (gen. vern.) | 1. |
| see subnapaeae-divisa Pionn. | 8. | impunctata de Silv. Cruz. & G. | 3. | narapae Klemmn. (hybr.) | 8. |
| | | impunctata Rbb. | 3. | nelo Bergstr. | 3. |
| elongata Der. | 9. | infrabasipuncta Stammesh. | 12. | (nigrans Vty. rapae, not napi 2.) | |
| emiobscurata Müll. (Vty. n. nud.) | 5. | innocens Staud. | 13. | nigrocellularis Kromer. | 12. |
| | | (interjecta Rbb. | 14.) | nigronotata Müll. (Vty. n. nud.) | 5. |
| | | interjuncta Cab. | 7. | nigrovenosa de Selys. | 8. |
| | | intermedia Krul. | 9. | | |
| | | intermediaria Müll. | 13. | | |
| | | intersecta Müll. (Vty. n. nud.) | 3. | | |
| | | irica Müll. | 1. | | |
| | | irregularis Thomps. | 2. | | |

INDEX(cont'd.)

| | | | | | |
|--------------------------------|------|------------------------------|-----|----------------------------|------|
| obscura Lingon. | 10. | sabellicae Stephs. | 1. | venata Müll.(Vty.nom.nud.) | 11. |
| obscurata Müll.(Vty.nom.nud.) | 1. | schmidtii Schmidt. | 2. | vidua Don. | 9. |
| obsoleta Rbb. | 4. | semifasciata Cab. | 6. | (violascens Bub. | 14.) |
| ochreata Vty. | 11. | semimaculata Müll. | 4. | virilis Rbb. | 4. |
| olivacea Froh. | 2. | septentrionalis Vty. | 1. | | |
| | | striata Müll.(Vty.nom.nud.) | 8. | | |
| | | subnapaeae-divisa Pionn. | 8. | wolenskyi Berger. | 7. |
| pallidus Froh. | 2. | subtalba Schima. | 11. | | |
| (patunae Staud. | 14.) | subtimpunctata Müll. | 12. | | |
| posteromaculata Rev. | 8. | subtimpura Müll. | 11. | | |
| praenapaeae Vty. | 1. | subtinnotata Müll. | 13. | | |
| premeridionalis Rocci. | 5. | subtochracea Kautz. | 11. | | |
| pseudomeridionalis Müll. | 13. | subtunipunctata Müll. | 12. | | |
| pseudometa Marqu. | 9. | subtus-confluens Kautz. | 12. | | |
| pseudometa Stip. | 9. | subtus-divisa Kromer. | 13. | | |
| pseudoradiata Müll. | 9. | subtus-irrorata Kromer. | 11. | | |
| pseudoradiata-obscura Marqu. | 9. | subtus-magnomaculata Kautz. | 12. | | |
| pseudoradiata-obscura Stip. | 9. | subtusposteromaculata Müll. | 12. | | |
| pseudovernalis Müll. | 5. | suffusa Vty. | 11. | | |
| punctata Nordstr. | 5. | sulphurea Schoy.(Vty.n.nud.) | 2. | | |
| punctigera Müll.(Vty.nom.nud.) | 7. | sulphureotincta Reut. | 3. | | |
| | | supermaculata Müll. | 6. | | |
| quaterpunctata Gel. & Luc. | 7. | | | | |
| | | tenuimaculosa Vty. | 5. | | |
| | | thurneri Gorn. | 3. | | |
| radiata Froh. | 2. | thusnelda Staud. | 4. | | |
| (radiata Rbb. | 14.) | translata Thomps. | 6. | | |
| (radiata-lutescens Schima. | 14.) | triangulata Dufr. | 6. | | |
| rapaeula Staud. | 8. | trircircummaculata Sousa. | 6. | | |
| regressa Krul. | 9. | trimaculata Rocci. | 6. | | |
| (röberl Kautz. | 14.) | | | | |
| rotunda Easton. | 9. | | | | |
| | | uniformis Müll.(Vty.n.nud.) | 11. | | |
| | | uninigrata Der. | 8. | | |

1.

Pieris Schrank.

napi Linnaeus. Syst. Nat. 1758. X. p. 468.

aberrational forms etc.

gen. vern.

f. napi Linnaeus. Syst. Nat. 1758. X. p. 468.

The Spring generation and type form. Normally the species in England is double-brooded.

gen. aest.

f. napaeae Esper. Eur. Schmett. 1777. 1. (2). pl. 116. f. 5.

= prenapaeae Verity. Ent. Rec. 1922. 34. p. 137.

The summer brood. The figure shows the underside of the hindwings very plain, little marked and little yellow.

Verity gave the name prenapaeae for specimens of the summer generation in England which he says are only transitional to napaeae Esper, not showing the full character.

This is not so, some may not, but most agree exactly with Esper's figure. The name can be used if desired for these transitional specimens.

napi

subsp. sabellicae Stephens. Ill. Brit. Ent. Haust. 1827. 1. p. 21. pl. 3. f. 3-4.

= septentrionalis Verity. Ent. Rec. 1916. 28. p. 77.

The English subspecies.

The first name given for an English example is sabellicae Stephens. Verity gave the name septentrionalis which however must be dropped in favour of the first name given, however absurd it may be to give an aberrational name to a race.

There is much confusion over the ab. sabellicae, Butt in his Brit. Butts. having given a completely misleading description. Lampke in Lamb. 31. p. 99. cleared up most of this but states that the colour of it was white whereas Stephens says yellowish-white. Stephen's description says "Allied to napi but dissimilar in form, the wings shorter or more rounded, the upper surface yellowish-white with broad dusky irrorated nervures, broadest towards the hinder margin". The form therefore would seem to be of the Spring generation, rather more marked than usual on the veins although the figure does not bear this out. The figure of the underside shows a most extraordinary spring brood example. In view of this it seems strange that the rules compel one to use the name for the English subspecies.

napi

subsp. britannica Verity. Rhop. Pal. 1911. p. 332. pl. 32. f. 4-6.

The subspecies from Ireland and parts of Scotland. See description.

napi

subsp. britannica Verity.

gen. aest. irica Muller. Muller & Kautz. napi & bryoniae. 1938. p. 8.

The darker summer generation from Ireland. Types from Co. Down.

ab. carnea Verity. Rhop. Pal. 1908. p. 149. pl. 32. f. 49.

The ground colour especially, towards the base, of a flesh colour veiled with grey scales.

ab. obscurata Muller. (Verity nom. nud. 1911.) Mull. & Kautz. napi. 1938. p. 130.

All wings uniformly pale grey.

ab.fumigata Gillmer. Ent. Z. 1905. 19. p. 157.

All wings of a smoky grey, the costa delicate pale yellow.

ab.fumosa Thompson. Proc. S. Lond. Ent. & Nat. Hist. Soc. (1946-47) 1947. p. 120.

The entire surface of the wings smoky, greyish coffee colour.

The type is in the R.C.K. Coll. here at Tring.

ab.nigrans Verity. Rhop. Pal. 1908. p. 150. pl. 52. f. 50.

This name should be withdrawn from *P. napi* since Oberthur who had the specimen says that it is definitely *P. rapae*. See ab.nigrans Lempke under *P. rapae* in these notes.

ab.pallidus Frohawk. Vars. Brit. Butts. 1938. pl. 29. f. 4.

Albino form. All the black markings replaced by dull pale grey appearing almost transparent.

ab.sulphurea Schoyen. Ent. Tidskr. 1885. 6. p. 140.

= flava Cockerell. Entom. 1889. 22. p. 126.

= aurea Mosley. Nat. Journ. 5. Suppl. (March) pl. 6. pl. 2. f. 10.

= hibernica Schmidt. Ent. Z. 1913. 27. p. 134.

= flava Oberthur. Lep. Comp. 1925. 22. (2). p. 96. pl. DXCIII. f. 5018-19. (nom. preoc. Cockerell)

= lutea Oberthur. Lep. Comp. 1925. 22. (2). p. 96. pl. D CIII. f. 5020.

= citronea Frohawk. Entom. 1928. 61. p. 77. (see Head, Entom. 68. p. 51. 1935)

= flavescens Frohawk. Entom. 1928. 61. p. 77. (nom. preoc. Tutt.)

Schoyen's sulphurea was sulphur-yellow on upper and underside.

Cockerell's flava bright canary-yellow upper and underside. Type in R.C.K. Coll.

This was described from the specimen mentioned in Barrett vol. 1. p. 25, most authors missing it. The specimen was taken in Norfolk.

Mosley's aurea was almost certainly of this same form since he likens it to a water-colour by Miss Barrett, probably the same insect mentioned above in Barrett vol. 1. p. 25, which was bright canary-yellow.

Schmidt's hibernica, described from specimens of the "Head" strain was bright canary-yellow above and below.

Oberthur's flava was also from the "Head" strain and given as "flava Head". The figures show ♂ and ♀ bright yellow above and below. His lutea much paler.

Frohawk's citronea and flavescens were the extreme ends of the depth of yellow, citronea being a rich citron-yellow, flavescens a pale primrose.

Bowden who had seen the type of lutea Oberthur says that it is certainly of the sulphurea group.

ab.schmidtii Schmidt. Ent. Z. 1913. 27. p. 134.

All wings above and below canary-yellow as in the preceding but overlaid with grey.

ab.olivacea Frohawk. Entom. 1928. 61. p. 77.

All wings bright canary-yellow but the black markings replaced by olive-brown.

ab.radiata Frohawk. (nom. preoc. Rober.) Entom. 1928. 61. p. 77.

All wings above and below bright canary-yellow with the veins heavily outlined with dark scales.

ab.irregularis Thompson. Proc. S. Lond. Ent. & Nat. Hist. Soc. (1946-47) 1947. p. 120.

Specimens of the yellow strain (sulphurea) with the pigmentation unevenly distributed on both upper and underside, giving the effect of having been bleached.

ab.citronella Thompson. Entom.1951.84.p.177.

The ground colour as in normal napi but the colia and immediate outside margins of all wings flushed with bright citron-yellow, particularly at the apex disappearing as it reaches the tornus, never occurring along the inner margin.

by Ryska.

ab.headi Neschner. Ent.Nachrichtenblatt Ost.Schweiz.Ent.1951.3.p.108.(pl.5.f.1-2.)
Specimens of the yellow "Head" strain, citron yellow above and below, but completely without pattern. There is no dusting on the veins, in particular on the underside of the hindwings.

Most probably the yellow form of albino. The plate by Ryska shows an albino of the yellow strain which he calls ab.headi but this has a normal pattern on the upper-side but in the silver-grey of the albino form.

ab.sulphureotincta Reuter. Acta.Soc.Fenn.1893.9.p.10.

From Russian Lapland and may be confined to it. I have not seen the original description but most authors say that it is of a dirty yellow above and bright canary-yellow below.

ab.apicenudata Verity. Ent.Rec.1916.28.p.79.

= intersecta Muller. (Verity nom.nud.1911.) Mull. & Kautz.napi.1938.p.137.

Verity is not clear in his description but presumably the male has the apical mark broken up into a series of triangular patches at the ends of the veins which are usually very pale. In the female it is sometimes lacking altogether.

Muller's intersecta, (from Verity's footnote description in Rhop.Pal.) had the apical mark divided by light streaks.

ab.biroi Dioszeghy. Rov.Lapok.1913.20.p.193.

Female in which the black apical mark is absent.

ab.nelo Bergstrasser. Nomencl.1779.2.p.47.pl.32.f.2.

There is much confusion over this form, some authors placing it in napi and some with rapae. It has been fixed by Lempke in Lamb.45 f.57.1945 as belonging to napi. The figure looks more like a rapae but Bergstrasser states in his text that it may be a variety of napi, presumably because of the underside markings.

The form is therefore a male napi showing a costal mark or spot above the median discal spot and with the main apical triangular mark absent.

Lempke names the analogous form in P.rapae "ab.costimaculata".

ab.innocens Stauder. Mitt.Munch.Ent.Ges.1922.12.p.22.

= deterosa Muller. (Verity nom.nud.1911.) Mull. & Kautz napi.1938.p.137.

Male with the upperside completely white with no trace of black.

Muller's deterosa had all the black markings of the upperside obliterated.

ab.impunctata Rober. Seitz Macrolep.1907.1.p.48.

p.13.

= impunctata Da Silva Cruz & Goncalves. Mem.Mus.Zool.Univ.Coimbra.1943.Ser.I.no.150.

Male. No markings on the upperside except the apical mark and basal suffusion.

ab.kautzi Gornik. Z.Ost.Ent.Ver.1931.16.p.78.

Male. The black costal spot on the hindwings is absent. The discal spot of the forewings is however present.

ab.thurneri Gornik. Z.Ost.Ent.Ver.1931.16.p.78.

Forewings without the black discal spot but the hindwings showing a black costal spot

ab. immaculata Strand. Wyt. Mag. Natur. 1901. 39. no. 1. p. 44.

= *thusnelda* Stauder. Bull. Soc. Adriat. 1922. 27. p. 139.

Female form with less pattern on the upperside. The black spots completely absent or almost so.

ab. virilis Rober. Seitz Macrolep. 1907. 1. p. 48.

Female resembling a male. The upperside of the forewings with a blackish apex and slight basal darkening and the hindwings with a small black costal spot, no other markings.

Apparently even the inner-marginal streak, as well as the discal spots, is absent.

ab. semimaculata Muller. Mull. & Kautz napi. 1938. p. 128. pl. 12. f. 11-12.

Female. On the upperside of the forewings only one of the two discal spots is present, either the upper or the lower one.

ab. destrigata Muller. Mull. & Kautz. napi. 1938. p. 128. pl. 14. f. 15.

Female. The two discal spot on the upperside of the forewings are present but there is no dark streak on the inner margin.

ab. obsoleta Rober. Seitz Macrolep. 1907. 1. p. 49.

The markings strongly obolescent, no prominent markings.

ab. nana Rober. Seitz Macrolep. 1907. 1. p. 48.

Small male, slightly yellowish. At the apex of the forewings there is only a greyish darkening at the ends of the veins, no other markings except the dark basal suffusion.

ab. flavescens Tutt. Brit. Butts. 1896. p. 237.

= *flava* Kane. (nom. preoc. Cockerell). Entom. 1893. 26. p. 119.

Female form only. Tutt, describing *ab. sulphurea* males as clear sulphur-yellow, adds his description of what he thought were the females of it "the females yellow". He follows this with "the underside pale as in *napaeae*, the veins indistinct".

These are not the females of *sulphurea* which are yellow on the underside but the yellow ones taken in Caithness, Orkney, and sometimes in England with a more or less normal underside and the same as the form which Kane named *flava*. Kane's *flava* was described as saffron-yellow on the upperside with the base and nervures as far as the fringes beautifully suffused grey. Underside of the hindwings and apex of forewings yellow-ochre, approaching orange.

The form is separated from *sulphurea* Schoyen (the yellow Head strain) by having only the apex of the underside of the forewings yellow, the disc being white. In the yellow Head strain the disc is also yellow.

ab. flavicans Muller. Mull. & Kautz. 1938. p. 87 & 100. pl. 2. f. 9.

Female of a not very decided yellowish colour.

The figure shows a specimen merely tinted with yellow, less than *flavescens* Tutt but transitional to it. Type from Perthshire.

ab. fuscognata Lempke. Tijdschr. Ent. 1953. 96. p. 287.

The colour of the markings of the upperside not grey or blackish but distinctly brownish.

ab. *tenuimaculosa* Verity. Ent. Rec. 1922. 34. p. 139.

Specimens of the summer generation with distinctly reduced discal spots.

Described as a summer gen form of the subsp. *meridionalis* but Lampke accepts the name to include all such weakly marked examples. See Tijdschr. Ent. 96. p. 289.

ab. *premeridionalis* Rocci. Mem. Soc. Ent. It. 1929. 8. p. 108.

The upperside of the forewings without a trace of the dark veining and the dark basal dusting almost gone, the rest of the markings reduced.

ab. *grisea* Sibille. Lamb. 1927. 27. p. 74.

= *griseopicta* Muller. Mull. & Kautz. napi. 1938. p. 137. (Verity nom. nud. 1911)

The costa, apex and basal area of the forewings of a pearl or silver-grey as are also the nervures.

Muller's *griseopicta* had all the black markings replaced by grey.

ab. *pseudovernalis* Muller. Mull. & Kautz. napi. 1938. p. 99.

Specimens of the summer generation with grey pattern instead of black and therefore appearing as Spring generation.

ab. *bicolor* Muller. Mull. & Kautz. napi. 1938. p. 133. pl. 14. f. 13.

The grey markings contrast with the black of the discal spots of the forewings and the black costal spot of the hindwings.

ab. *basiochracea* Kautz. Mull. & Kautz. napi. 1938. p. 148. pl. 14. f. 13.

The base of the forewings instead of black or grey is ochre coloured.

ab. *emiobscurata* Muller. (Verity nom. nud. 1911.) Mull. & Kautz. 1938. p. 130.

The basal wash invades a great part of the wings.

This is not the same as ab. *basinigra* Harw. as Muller suggests.

ab. *basinigra* Harwood. Entom. 1909. 42. p. 40.

The basal portion of all wings conspicuously black.

Type in the R. C. K. Coll. at Tring, C.

ab. *bimaculata* Schima. Verh. Zool. bot. Ges. Wien. 1910. 60. p. 280.

= *bipunctata* Osthelder. Schmiedt. Sudbayern. 1925. 1. p. 60.

Male. On the upperside of the forewings there are two black discal spots instead of the normal one, the extra one being the lower, nearest the inner margin.

ab. *punctata* Nordstrom. Ent. Tidskr. 1933. 54. p. 153. pl. 1. f. 3.

= *nigronotata* Muller. (Verity nom. nud. 1911.) Mull. & Kautz. napi. 1938. p. 124.

Male showing a well defined black spot in the disc of the forewings and a costal spot on the hindwings.

The type form has a spot in the disc, Rober restricting this to the type form in 1907, presumably the "well defined" term means that it is more prominent.

ab. *magnonotata* Muller. Mull. & Kautz. napi 1938. p. 125. pl. 11. f. 13.

The black costal spot of the hindwings very much enlarged.

ab. magnomaculata Muller. Mull. & Kautz. napi. 1938. p. 125. pl. 11. f. 13.

The discal spots of the forewings in the female so enlarged that they extend beyond their interneural spaces.

ab. longomaculata Muller. Mull. & Kautz. napi. 1938. p. 125. pl. 11. f. 11.

The discal spots of the forewings of the female elongated longitudinally.

ab. supermaculata Muller. Mull. & Kautz. napi. 1938. p. 125. pl. 11. f. 14.

= *tricircummaculata* Sousa. Mem. Zool. Univ. Coimbra. 1929. 31. p. 2.

Female showing a definite black spot near the costal apex of the forewings, extending out from the apical patch and thus appearing as three distinct spots, two discal and one costal.

Sousa's *tricircummaculata* was described as an aberration of the subsp. *lusitanica* and had a superimposed circular spot near the apex.

ab. conjuncta Lempke. Tijdschr. Ent. 1953. 96. p. 288. (nom. precoc. Muller)

On the upperside of the forewings the upper discal spot is connected by dark suffusion to the apical patch.

ab. translata Thompson. Proc. S. Lond. Ent. & Nat. Hist. Soc. (1954-55) 1954. p. 123.

The discal spots of the forewings very much nearer to the outer margin than in normal specimens. In extreme examples there is only a thin patch of white scales present to separate them from the margin.

ab. triangulata Dufrane. Ann. Soc. Ent. Belg. 1947. 83. p. 151 (correction of error, p. 51)

The apical mark of the forewings very large and in the form of an equilateral triangle. The black in certain of the intervals is feebly divided by faint traces of the white ground colour.

ab. impleta Thompson. Proc. S. Lond. Ent. & Nat. Hist. Soc. (1946-47) 1947. p. 121.

Female with the apical patch extended to form an area entirely covered with black scales from the costal extremity of vein 10 down to the upper black discal spot, then along to the margin at the extremity of vein 4, enveloping the black spot. Apparently more extreme than the preceding *triangulata*.

ab. lambillioni Dufrane. Rev. Mens. Soc. Ent. Nam. 1910. p. 48.

Male with the apical mark very strong, the nervures thin but very black. The bases of the wings carbon black travelling up the costa and almost joining the apical patch. Head, antennae, thorax and abdomen strongly blackish.

ab. lachrymosa Thompson. Proc. S. Lond. Ent. & Nat. Hist. Soc. (1946-47) 1947. p. 121.

Males which on the upperside exhibit a series of black scales immediately below the normal forewing discal spot. The scales may also be produced towards the apex. For underside form of similar character see *ab. fulgoris* see "Underside forms".

ab. trimaculata Rocci. Atti. Soc. Ligust. Sc. Nat. 1919. 30. p. 31.

An extra black spot between the two normal discal spots on the upperside of the forewings, making three.

ab. semifasciata Cabeau. Rev. Mens. Soc. Ent. Nam. 1924. 24. p. 17.

Female showing two small black spots between the two discal spots on the upperside of the forewings.



ab. confluens Schima. Verh. zool.-bot. Ges. Wien. 1910. 60. p. 287.

On the upperside of the forewings the two black discal spots are united by black scales.

ab. continua Bryk. Ent. Tidskr. 1923. 44. p. 107. fig.

= conjuncta Muller. (Verity nom. nud. 1911.) Mull. & Kautz napi. 1938. p. 126. pl. 12. f. 3.

Female form with the two discal spots and the apical patch all joined up by black scales thus forming a continuous black band.

ab. interjuncta Cabeau. Lamb. 1928. 28. p. 101. (fig. 1930. pl. 4. f. 1.)

A combination form of continua Bryk, the preceding, and posteromaculata Reverdin and the ab. of P. rapae binigrata Derenne.

The forewings upperside show the discal spots and the apical patch joined by a suffusion of black scales forming a broad band. The hindwings show a dark spot in the disc and a smaller one immediately below the black costal spot.

Transitional to the following ab. fasciata Kautz.

ab. fasciata Kautz. Z. Wien. Ent. Ges. 1953. 38. p. 26.

= cincta Caruel. Rev. Fr. Lep. 1954. 14. p. 153.

Female with the discal spots and apical patch all joined by black scales to form a black band as in ab. continua Bryk. In addition the hindwings also show a band of broken spots, the normal costal one and three others below it.

Slightly more extreme than the preceding, the extra spot placed near the anal angle causing the hindwing band to appear much more complete.

ab. quaterpunctata Gelin & Lucas. Mem. Soc. Deux. Sevres. 1912. p. 25.

Female with an extra black spot between the two discal spots of the forewings and a small dark spot in the disc of the hindwings. A combination of trimaculata Rocci and posteromaculata Reverdin.

ab. punctigera Muller. Mull. & Kautz napi. 1938. p. 123. pl. 11. f. 2. (Verity nom. nud. 1911.)

A series of small black spots at the extremities of the veins, especially on the hindwings.

ab. marginestixis Dannehl. Mitt. Münch. Ent. Ges. 1927. 17. p. 1.

= cuneata Muller. Mull. & Kautz. 1938. p. 130. pl. 15. f. 6 & 12.

On the upperside of the hindwings the veins are broadened as they approach the margins, forming rather large wedges of deep black.

ab. wolenskyi Berger. Z. Ost. Ent. Ver. 1925. 10. p. 35. fig.

On the upperside of the hindwings, at the extreme ends of the veins, are large round spots of a greyish colour, starting at the apex and decreasing in size towards the anal angle.

Differs from the preceding by the round, not wedge-like spots.

ab. gorniki Kautz. Verh. zool.-bot. Ges. Wien. 1927. 77. p. 50.

Female with pale grey shading on the margins of all wings, intersected by interneural white streaks.

ab. lineata Muller. Mull. & Kautz napi. 1938. p. 123. pl. 16. f. 2.

A dark marginal line preceding the fringe on the margins of all wings.

ab. posteromaculata Reverdin. Bull. Soc. Lep. Gen. 1910. 2. p. 46. pl. 2. f. 1.
On the upperside of the hindwings a small dark spot in the disc.

ab. uninigrita Derenne. Lamb. 1935. 35. p. 236. pl. 12. f. 1.
On the upperside of the hindwings there is a supplementary black spot, small and situated immediately beneath the large costal spot.
This is above the position of the spot in the preceding.

ab. divisa Lempke. Tijdschr. Ent. 1936. 79. p. 247.
On the upperside of the forewings the lower of the two black discal spots is divided into two parts.

ab. subnapaeae-divisa Pionneau. Misc. Ent. 1928. 31. p. 49. (correction)
= napae-divisa Pionneau. Proc. Verb. Soc. Linn. Bord. 1924. 76. p. 88. (in error)
Since this form is linked by name to Verity's race subnapaeae it cannot be used for British examples. Presumably Lempke has given the covering name "divisa" for all examples of the form, which is very much more sensible.

ab. heptopotamica Krulikowsky. Rev. Russe Ent. 1904. 4. p. 90.
On the upperside the specimen looks like P. rapae but on the underside like napi.

ab. rapaeula Stauder. Mitt. Munch. Ent. Ges. 1922. 12. p. 22.
Believed to be hybrid rapae X napi. See description.

hybrid

narapae Klemann. Int. Ent. Z. (1929-30) 1930. 23. p. 438-442.
A definite hybrid napi ♂ X rapae ♀, bred from a pairing obtained and observed by the author. In the majority of specimens napi predominated.

hybrid narapae

ab. flava Klemann. (nom. preoc. Cockerell 1889) Int. Ent. Z. (1929-30) 1930. 23. p. 442.
One female hybrid napi X rapae with yellowish ground colour with strikingly enlarged black markings.

ab. striata Muller. (Verity nom. nud. 1911) Mull. & Kautz napi. 1938. p. 123. pl. 11.
On the upperside of the forewings the lower discal spot connects with the margin in a neural streak.
This seems to be a form with such a large degree of development that it can hardly be tied to one particular form.

ab. nigrovenosa de Selys. Enum. Ins. Lep. Belg. 1844. p. 29.
Female form. On the upperside the veins are strongly powdered with black almost like bryoniae, but the ground colour is not yellowish.
This is regarded as a synonym of sabellicae Stephens by most authors but I cannot see why. In the figure of sabellicae the veining is not at all striking and Stephens makes a point of the rounded wings. Tutt is possibly responsible since, in his Brit. Butts. 1896. p. 237., he states that Selys himself regarded sabellicae as being the same as his nigrovenosa.
Selys's nigrovenosa therefore is the name for napi of normal build and ground colour, with the veins standing out strongly dusted with black.

ab.pseudoradiata Muller. Mull. & Kautz. napi 1938. p. 98. pl. 2. f. 7.

Like the preceding nigrovenosa Selys but in addition has a streak from the lower discal spot to the margin as in bryoniae so that it can hardly be distinguished from bryoniae-radiata.

ab.vidua Donovan. Cat. Macrolep. Ireland. 1936. p. 3.

Confined to the Irish subsp. britannica Verity. The nervures thickened and very black and the black of the apical patch similarly intensified, corresponding to Barrett's description -- "in the north of Ireland, especially in the second brood, females occur in which the apex is strongly black, the spots large and the nervures much more thickened or blackened."

We have the type in the R.C.K. Coll. at Tring.

♀ ab.pseudoradiata-obscura Stipan. Ent. Nachricht. 1952. 4. p. 36.

= pseudoradiata-obscura Marquardt. Ent. Z. 1958. 68. p. 256.

Like pseudoradiata Muller with streaked margin but also a darker specimen. The veins of the upperside are more heavily scaled and there is a heavy grey basal scaling as far as the disc and beyond, also the hind marginal cell as far as the margin.

♀ ab.pseudometa Stipan. Ent. Nachricht. 1952. 4. p. 37.

= pseudometa Marquardt. Ent. Z. 1958. 68. p. 256.

Two different specimens. In number 1 the basal field is almost without pattern and the median field entirely without. The marginal field has thick light grey marginal band (with marginal streak). The discal spots are enlarged, the third (uppermost) is clearly developed as in supermaculata Muller. The hindwings, with the exception of the poorly developed costal spot, without pattern.

In number 2 specimen (extreme) whilst the ground colour remains white, the whole of the patterning is heavy blackish-brown. The basal dusting is extended as far as the median field and on the costa to beyond the middle, on the inner margin as far as the margin. Forewings with a broad heavy marginal band and very strongly developed marginal streak connecting with the lower discal spot. Hindwings on the margin as far as vein M2 there are strong partly united spots and there is posteromaculata marking below the enlarged costal spot between M1 and M2 and below C1 and C2 which cut off the inner side of the strengthened dusting on the veins. The example is a transition to the supermeta type.

ab.rotunda Easton. Ent. Rec. 1948. 60. p. 121.

Round-winged form with reduced wing expanse. The outer margin of the forewings strongly convex and the apical angle distinctly obtuse. In most specimens the distance between the apex and the inner angle is almost the same as between the base and the apex. Bred in series by Easton.

ab.elongata Derenne. Rev. Mens. Soc. Ent. Nam. 1924. 24. p. 57.

Forewings drawn out or elongated as in the ab.elongata Gelin of P.brassicae.

ab.regressa Krulikowsky. (nom. nov. pro intermedia Krul.) Iris 1908. 21. p. 209.

= intermedia Krulikowsky. Bull. Soc. Nat. Mosc. (1890) 1891. new ser. 4. p. 211. pl. 8. f. a.

Female. Strongly darkened with the basal half of the wings strongly dusted and dark dusting between the upper discal spot and the apical patch. The veins strongly darkened and sometimes a black dusting along the inner margin as in ab.pseudoradiata Muller. The form appears somewhat similar to bryoniae. The hindwings upperside not mentioned, so presumably normal.

The figure shows the apical area (twice the area of the normal black mark) well dusted with dark scales, the apical mark itself still standing out in blackish. The base dark dusted and stretching out along the inner margin to the middle of the wing. The hindwings more or less normal.

- ab. minor Agassiz. Mitt. Schweiz Ent. Ges. 1900. 10. p. 288.
= napella Lambillion. Pap. de Belg. (Nat. Hist. et Moeurs) 1902. p. 18.
= minor Crombrughe. Ann. Soc. Ent. Belg. 1902. 46. p. 20.
= minima Verity. Rhop. Pal. 1908. p. 143. pl. 32. f. 20.
= minima Muschamp. Ent. Rec. 1911. 23. p. 273.
= nanella Strand. Arch. Naturg. 1920. 85. A4. p. 214.
= lambella Kautz. Verh. zool-bot. Ges. Wien. 1927. 77. p. 48.
= nana Finke. Int. Ent. Z. 1934. 28. p. 394. (nom. preoc. Rober)

The description of these dwarfs varies somewhat but it seems best to include them all under the first name by Agassiz.

Small and very small specimens.

11. napi Linn. continued.
(underside forms)

ab. ochreata Verity. Ent. Rec. 1919. 31. p. 87.

= subtochracea Kautz. Mull. & Kautz napi. 1938. p. 148. pl. 13. f. 10.

Female of the summer generation with the underside of a bright ochreous ground colour.

Kautz's subtochracea would appear to be the same, the colour of the hindwings ochre instead of yellow, the forewings normal.

ab. subtimpurea Muller. Mull. & Kautz napi. 1938. p. 133. pl. 1. f. 11

The whole of the underside of the forewings yellowish. Found mostly in the summer generation.

The figure shows the disc of the forewings merely off-white, only faintly tinged with yellow.

ab. flavopicta Muller. (Verity nom. nud. 1911) Mull. & Kautz napi. 1938. p. 137.

On the underside the green markings are replaced by yellow.

ab. venata Muller. (Verity nom. nud. 1911) Mull. & Kautz napi. 1938. p. 137

On the underside the green vein dusting is replaced by grey.

ab. subalba Schima. Verh. zool.-bot. Ges. Wien. 1910. 60. p. 289.

On the underside of the hindwings and apex of forewings the normal yellowish colour is replaced by milky-white

ab. henrici Oberthur. Lep. Comp. 1913. 7. p. 671. pl. CLXXIX. f. 1833.

Underside of the hindwings showing the veins heavily dusted or thickened in the basal two thirds, after which they become narrow, or less dusted, in the outer third of the wings

ab. latecincta Muller. Mull. & Kautz. 1938. p. 131. pl. 13. f. 4-5.

The veins on the underside of the hindwings are broad right through to the margins, not diminishing as in normal napi.

ab. suffusa Verity. Rhop. Pal. 1908. p. 143. pl. 32. f. 10.

On the underside of the hindwings the green neural streaks are very broad and diffused and instead of becoming narrower towards the margin are enlarged in a striking manner after leaving the basal area. The result is that the wings are so dark that they could be described as being entirely powdered with olivaceous-green scales with light streaks in the internodal spaces.

The coloured figure does not seem to be nearly so dark dusted as the description implies.

ab. uniformis Muller. (Verity nom. nud. 1911) Mull. & Kautz napi 1938. p. 137.

The green markings of the underside invade the whole surface of the hindwings.

ab. subtus-irrorata Kromer. Z. Wien. Ent. Ges. 1957. 42. p. 146. pl. 10. f. 4.

On the underside of the hindwings the outer margin is dark dusted, similar to the upperside form ab. irrorata Nies. of *P. bryoniae*.

ab. nigrocellularis Kromer. Z. Wien. Ent. Ges. 1957. 4. p. 147. pl. 10. f. 3.

On the underside of the hindwings the whole of the cell 7 is uniformly powdered over with dark scales. This complete darkening of the cell, which shows no normal yellow, gives the appearance of dirty grey-yellow. Occurs in both *napi* and *bryoniae*. The figure shows cell 7, in the costal area between the subcostal vein and first radial, filled in with dark scales, darkening the costa from the base outwards.

ab. bipartita Kromer. Z. Wien. Ent. Ges. 1956. 41. p. 286. (fig. vol. 42. pl. 10. f. 2.)

On the underside of the hindwings the middle cell is divided into two parts along its length by a thin stripe of scales.

Described in 1955 under *bryoniae* but included in *napi* in 1956.

ab. fulgoris Thompson. Proc. S. Lond. Ent. & Nat. Hist. Soc. (1946-7) 1947. p. 121.

Males which on the underside exhibit a series of black scales immediately below the normal forewing discal spot. In some cases these scales form a band uniting the two spots when both are present but occurs equally well in specimens having the lower spot absent. As in *ab. lachrymosa* Thompson in which this character is on the upperside only, the black may extend upwards to the apex.

Presumably the upperside is normal.

ab. subtus-confluens Kautz. Z. Wien. Ent. Ges. 1943. 48. p. 130.

On the underside of the forewings the two discal spots are united by dark dusting. Presumably the upperside is normal.

The preceding *fulgoris* with the same character was for males only so if Kautz's name is used it must be for females.

ab. subtus-magnomaculata Kautz. Z. Wien. Ent. Ges. 1943. 48. p. 130.

On the underside of the forewings the discal spots are distinctly enlarged. This is much rarer than when on the upperside.

ab. infrabasipuncta Stammeshaus. Ent. Ber. (Amst.) 1954. 15. p. 271.

On the underside of the hindwings near the base between subcosta and radius is a dark spot of the same colour as the suffusion along the nervures.

ab. subtusposteromaculata Muller. Mull. & Kautz. *napi*. 1938. p. 116.

On the underside of the hindwings the dark spot in the disc, seen in *ab. posteromaculata* Reverdin on the upperside, is present.

Presumably the upperside does not show it.

ab. subtunipunctata Muller. Mull. & Kautz. *napi*. 1938. p. 127. pl. 13. f. 13-15.

On the underside of the forewings only one discal spot, in the male the lower one, in the female the upper one.

ab. subtim punctata Muller. Mull. & Kautz. *napi*. 1938. p. 127. pl. 14. f. 14.

On the underside of the forewings both discal spots are absent.

ab. aversomaculata Stach. Spraw. Kom. Fiz. 1945. 58. p. 113.

On the underside of the forewings there are three black discal spots, the two normal ones in the disc and a third near the apex.

ab. *subtus-divisa* Kromer. Z. Wien. Ent. Ges. 1956. 41. p. 287.

On the underside only the character of *divisa* Pionneau, i.e. - the lower discal spot divided into two parts.

ab. *subtinnotata* Muller. Mull. & Kautz napi. 1938. p. 127. pl. 12. f. 9.

On the underside of the hindwings the black costal spot is absent.

ab. *fountainae* Verity. Rhop. Pal. 1910. p. 331. pl. 59. f. 31.

Male. The underside of the hindwings showing the veins marked with a limited number of suffused scales but terminating at the margin in triangles of dense grey scales which contrast with the rest of the nervures which are green. The figure shows a fairly normal hindwing but with large triangular grey spots at the marginal end of the veins.

ab. *intermediaria* Muller. Mull. & Kautz napi. 1938. p. 132. pl. 13. f. 3.

Summer brood specimens only. The vein dusting on the underside of the hindwings narrow but as heavy as in the Spring brood (typical *napi*) and extending to the margin.

ab. *deficiens* Rocci. Atti. Soc. Ligust. Sc. Nat. 1919. 30. p. 28.

Summer brood specimens with the dark dusting of the veins on the underside of the hindwings strongly reduced, only in the basal half being slightly visible. Verity states that our English specimens are of the form and calls them a race - *prenapaeae*. Our summer form varies very much in this character and Rocci's form can stand as an aberration.

ab. *pseudomeridionalis* Muller. Mull. & Kautz. napi. 1938. p. 132. pl. 13. f. 6.

Summer brood specimens in which on the underside of the hindwings the vein darkening fails altogether.

This would seem to be the same as *napaeae* Esper.

not included in British forms.

The following forms belong to the race *flavescens* Wagner. They are transitional to *bryoniae* and differ from our *napi* by their ground colour etc. The references are given for comparison if needed.

- race or subsp. *flavescens* Wagner. Verh. zool.-bot. Ges. Wien. 1903. 53. p. 174. pl. 1. f. 1.
- ab. *interjecta* Rober. Seitz Macrolep. 1907. 1. p. 48.
- ab. *meta* Wagner. Verh. zool.-bot. Ges. Wien. 1903. 53. p. 176. pl. 1. f. 3.
- ab. *violascens* Bubacec. Verh. zool.-bot. Ges. Wien. 1922. 71. p. (23).
- ab. *flavometa* Schima Verh. zool.-bot. Ges. Wien. 1910. 60. p. 284.
- ab. *radiata* Rober. Seitz Macrolep. 1907. 1. p. 48. pl. 21. f. C row.
- ab. *radiata-lutescens* Schima. Verh. zool.-bot. Ges. Wien. 1910. 60. p. 275.
- ab. *patunae* Stauder. Iris. 1914. 28. p. 13.
- ab. *roberi* Kautz. (nom. nov. pro *meta* Rober) Verh. zool.-bot. Ges. Wien. 1927. 77. p. 53.
= *meta* Rober. (nom. preoc. Wagner). Seitz Macrolep. 1907. 1. p. 48. pl. 21, C.
- ab. *gunabris* Lorkovic. Acta entomologica Jugoslavica 7:1-9. or see Bowden Proc. Trans. Br. Ent. Nat. Hist. Soc. 16, 1963. This form is not British and resulted from a cross between *P. napi oleracea* from New Hampshire (U.S.A.) and Yugoslav *P. napi*, back crossed twice to *napi* but with selection throughout of *oleracea*-like phenotypes.

INDEX

| | | | |
|-------------------------------------|----|--------------------------|----|
| <i>addenda</i> Dufr. | 2. | <i>nana</i> Vty. | 3. |
| <i>alba</i> Müll. | 1. | <i>nigrans</i> Vty. | 2. |
| <i>alligata</i> Lpke. | 2. | <i>nitschei</i> Gorn. | 2. |
| <i>anastomosica</i> Strand. | 2. | | |
| <i>anthracina</i> Strand. | 1. | | |
| | | <i>ochrea</i> Vty. | 1. |
| <i>bellidice</i> Ochs. | 1. | | |
| <i>bimaculata</i> Rocci. | 2. | <i>rondoui</i> Vty. | 2. |
| <i>cinerea</i> Delah. | 1. | <i>subviridis</i> Pionn. | 1. |
| <i>conjugata</i> Mezg. | 2. | <i>sulphurea</i> Oberth. | 1. |
| <i>daplidice</i> Linn. (gen. aest.) | 1. | | |
| <i>drueti</i> Dufr. | 3. | | |
| <i>eluta</i> Vty. | 1. | | |
| <i>expansa</i> Vty. | 2. | | |
| <i>flava</i> Oberth. | 1. | | |
| <i>flavescens</i> Oberth. | 1. | | |
| <i>flavopicta</i> Vty. | 3. | | |
| <i>infragrisea</i> Goods. | 3. | | |
| <i>mariformis</i> Vty. | 1. | | |
| <i>mediodilata</i> Vty. | 3. | | |
| <i>minor</i> Ksien. | 3. | | |
| <i>minuscule</i> Vty. | 3. | | |
| <i>montensis</i> Dufr. | 2. | | |

daplidice Linnaeus. Syst.Nat.1758.X.p.468.

Aberrational forms etc.

gen.aest.

f.daplidice Linnaeus. Syst.Nat.1758.X.p.468.

The summer generation.

gen.vern.

f.bellidice Ochsenheimer. Schmett.Eur.1808.1.(2).p.159.

The Spring generation.

ab.anthracina Strand. Ent.Z.1904.18.p.85.

A remarkable dullness or darkening of the pale ground colour of the upper and underside.

ab.ochrea Verity. Rhop.Pal.1911.p.327.

The upperside yellow-ochre or brownish-yellow. Female.

ab.sulphurea Oberthur. Bull.Soc.Ent.Fr.1884.p.LXXV.

= ♀ flavescens Oberthur. Etudes Ent.1888.12.p.22.

= ♂ flava Oberthur. Etudes Ent.1896.20.p.4.pl.1.f.8.

Upper and underside ground colour of a beautiful yellow or canary-yellow. ♂ Oberthur for no apparent reason named the females of this form flavescens. These had the ground colour sulphur-yellow. He, again, named the same male from Biskra first called sulphurea, this time calling it flava and describing it, and another similar specimen, as chrome-yellow.

ab.subviridis Pionneau. Echange 1937.53.p.2.

On the upperside of the hindwings the colour is slightly greenish instead of yellowish.

ab.cinerea Delahaye. Suppl.Cat.Lep.Maine-et-Loire 1909.

On the upperside the normal black spots are greyish, some males have almost white wings.

ab.alba Muller. Int.Ent.Z.1930.24.p.154.

Completely without black spots on the upperside, the pattern of the underside showing through faintly.

ab.eluta Verity. Rhop.Pal.1911.p.327.pl.50.f.29.

The discoidal spot of the forewings reduced to a small dot.

♀ ab.mariformis Verity. Farf.Diurn.It.1947.3.p.178.pl.30.f.15.

The black spot nearest the hindmargin of the forewings (above the inner margin) is absent.

ab. *anastomosica* Strand. Int. Ent. 1.1909.3.p.78.

On the upperside of the forewings the white spot in cell 4 of the black marginal band is not enclosed in the black but united with the white ground colour.

ab. *bimaculata* Rocci. Atti. Soc. Ligust. Sc. Nat. 1919.30.p.32. (Verity nom. nud. 1908)
♂ A supplementary spot to the discal spot on the upperside of the forewings.

ab. *nitschei* Gornik. 4. Ost. Ent. Ver. 1932.17.p.81.

♂. On the upperside of the forewings there is an inner-marginal black spot feebly scaled but clearly defined, normally not present in the ♂. The hindwings show a large black costal spot and spots at the end of the veins enlarged.

ab. *addenda* Dufrane. Bull. Soc. Ent. Belg. 1947.83.p.50.

Female. On the upperside of the forewings is a supplementary black spot, well-marked, in the interneural space 2, above the large black spot near the inner margin.

ab. *conjugata* Mezger. Lamb. 1930.30.p.179.

Female. On the upperside of the forewings the black spot near the inner margin is united by black scales to the lower part of the antemarginal black border.

ab. *nigrans* Verity. Farf. Diurn. It. 1947.3.p.178.pl.30.f.15.

The figure shows the black pattern enhanced, the apical black area linking up with the discoidal black spot by black dusting along the veins. The basal area of all wings dusted with dark scales as far as the discoidal spots.

ab. *alligata* Lempke. Tijdschr. Ent. 1955.96.p.481.

♀. On the upperside of the forewings the black spot above the inner margin is connected by a black suffusion with the discal spot and this spot by black lines along nervures 2 and 3 with the black spots of the outer margin.

ab. *montensis* Dufrane. Ann. Soc. Ent. Belg. 1947.83.p.50.

♀. On the upperside of the forewings the black patterns strongly marked except the black spot above the inner margin which is reduced to slight dusting (atoms). The hindwings less marked with black than in the type form. On the underside the green parts are much paler than usual and the white parts extremely reduced, especially the median band, and the cellular white is reduced to a large dot.

ab. *rondoui* Verity. Rhop. Pal. 1908.p.132.pl.30.f.12-13.

The figure shows two specimens with a large suffused patch in the centre of the forewings, situated near the costa and covering the discoidal spot. It reaches the black apical pattern and its shape is roughly triangular. The underside of the hindwings is entirely green with a feeble trace of white macules.

ab. *expansa* Verity. Ent. Rec. 1919.31.p.87. (see Ent. Rec. 34.p.125)

Enormous size, often over 45 mm.

First described as a race from Tuscany but later found by the author to be found in all European localities.

ab.minuscula Verity. Rhop.Pal.1911.p.327.pl.66.f.12.
 = minor Ksienchopolsky. Trav.Soc.Wolhyn.1911.Sep.8.p.25.
 = nana Verity. Ent.Rec.1922.34.p.125.
 Extrmely small.

Both the minuscula Vty. and minor Ksien. being 1911,I cannot say which has priori

ab.flavopicta Verity. Rhop.Pal.1908.p.328.pl.30.f.11.
 On the underside the green is replaced by yellow.

ab.infragrisea Goodson. Entom.1953.96.p.281.
 On the underside the yellow scales,usually the most prominent in the chequered pattern,are absent,leaving the markings uniformly grey.

ab.mediodilata Verity. Harf.Diurn.It.1947.3.p.180.pl.30.f.23.
 The figure shows a ♀ underside with the black discoidal spot considerably enlarged. On the hindwings the green basal area is without the usual white spots or only a slight trace of the upper one.

ab.drueti Dufrane. Ann.Soc.Ent.Belg.1947.83.p.49.
 9. Spring generation.On the underside the green is not strong,the white patterns much reduced especially the cellular spot and discal band which is narrowed and shortened.

INDEX

| | | | | | |
|-------------------------|-----|---------------------------|-----|--------------------------|----|
| alberti Hoffm. | 5. | femininus B.-Haas. | 2. | ochracea Sälzl. | 2. |
| ampla Pionn. | 5. | flava Wilms. | 1. | ochrata Greer. | 1. |
| (andderinde | 7.) | flavescens Oberth. | 6. | ochrea Tutt. | 1. |
| (andrinde | 7.) | flavida-virescens Oberth. | 2. | | |
| androgyna Newnh. | 5. | flavoradiata Steph. | 1. | | |
| andromorpha Vty. | 5. | (flavosignata Closs. | 5.) | parvipuncta Trti. | 3. |
| antiquincunx Bryk. | 3. | flavus Froh. | 1. | perflavida Strand. | 1. |
| arsenoides Newnh. | 5. | | | proosti Lamb. | 1. |
| aureoflavescens Ckll. | 1. | | | pulverulenta Mezg. | 6. |
| | | hesperidis Newnh. | 3. | pupillata Lpke. | 3. |
| | | hibernica Wilms. | 5. | | |
| bilineata Mezg. | 6. | | | quadripunctata Fuchs. | 4. |
| bimaculata Müll. | 6. | | | | |
| buschmanni Müll. | 2. | immaculata Pabst. | 3. | | |
| | | | | radians Vty. | 4. |
| caulotosticta Wilms. | 3. | kutokovi Krul. | 6. | radiata Wilms. | 4. |
| cinerea Newnh. | 6. | | | reducta Masow. | 2. |
| citrona Wheel. | 6. | | | reignaci Gouin. | 1. |
| commaculata Oberth. | 5. | lasthenia Mill. | 2. | | |
| commaculata Vty. | 5. | lineata Lpke. | 4. | sagittata Car. | 4. |
| costaenigrata Closs. | 4. | lutea Gillm. | 1. | salmonea Oberth. | 2. |
| crassipuncta Mezg. | 3. | luteola Steph. | 1. | sassafrana Oberth. | 2. |
| crocea Rüb. | 1. | luteus Froh. | 1. | saxonia Her. | 1. |
| | | | | schepdaeli Cab. | 4. |
| deaurata Wilms. | 2. | macula-punctata Froh. | 3. | striata Pionn. | 4. |
| decolorata Car. | 4. | major Tutt. | 5. | subflavopicta Mezg. | 6. |
| decolorata Wilms. | 2. | marginata Greer. | 4. | substriata Car. | 6. |
| detersa Vty. | 2. | marginata Pionn. | 3. | subtusflavovenata Reuss. | 6. |
| discocellularis Strand. | 6. | marginemaculata Steph. | 4. | sulfureovenata Keyn. | 1. |
| dispila Rayn. | 6. | minor Ckll. | 5. | | |
| divisa Shelj. | 3. | minor Mosl. | 5. | transvestita Müll. | 2. |
| | | minora de Selys. | 5. | turritis Ochs. | 3. |
| | | nigrocellularis Oberth. | 3. | | |
| | | nigroconjuncta Uffeln. | 4. | umbratilis Steph. | 4. |
| | | | | umbrosa Culot. | 3. |
| | | | | williamsi Greer. | 4. |

cardamines Linnaeus. Syst. Nat. 1758. X. p. 468.
subsp. britannica Verity. Rhop. Pal. 1908. p. 190.

aberrational forms etc.

ab. luteola Stephan. Iris 1923. 37. p. 30.

= flavus Frohawk. Vars. Brit. Butts. 1938. pl. 41. f. 2.

Male. On the forewings the ground colour is yellow from the base to the orange apical tip, instead of white.

The hindwings are presumably normal, as they are in flavus Frohawk.

saxonia

ab. saxoni~~fa~~ Hering. Z. Wiss. Ins. 1912. 8. p. 234.

= flava Williams. Trans. Lond. Nat. Hist. Soc. 1915. p. 66.

Male. On the upperside the wings are pale yellow instead of white. The underside is normal.

ab. ochrata Greer. Ent. Rec. 1924. 36. p. 91.

Female. On the upperside all wings are of a dull ochreous-yellow.

ab. perflavida Strand. Deutsch. Ent. Z. 1924. p. 27.

Female. The upperside of the forewings washed yellow, the apex also unfused with yellow. The underside clear citron-yellow along the veins and washed with orange from the discoidal spot outwards.

The hindwings not mentioned so presumably normal.

ab. proosti Lambillion. Rev. Mens. Soc. Ent. Nam. 1919. 19. p. 50.

Female. The upperside of the forewings showing yellow stripes in the disc and yellow spots on the outer margin of the black apical tip. Hindwings yellow showing no trace of the underside marbling coming through.

ab. ochrea Tutt. Brit. Butts. 1896. p. 245.

Female. On the upperside of the hindwings the ground colour is almost entirely yellow.

ab. sulfureovenata Keynes. Ent. Rec. 1910. 22. p. 239.

= flavoradiata Stephan. Ent. Rundsch. 1917. 34. p. 12.

Upperside of the hindwings with the upper vein of the cell, and the upper four veins from the cell to the margin, strongly marked with bright sulphure-yellow.

ab. aureoflavescens Cockerell. Entom. 1888. 21. p. 189.

= lutea Gillmer. Ent. Z. 1907. 20. p. 237.

= reignaci Gouin. Proc. Verb. Soc. Linn. Bord. 1920. p. 72.

= luteus Frohawk. Vars. Brit. Butts. 1938. pl. 41. f. 1.

The orange tip of the male replaced by clear yellow.

= crocea Rüb. Seitz. Macrolep. 1907. 1. p. 54.

ab. sassafrana Oberthur. Lep. Comp. 1909. 3. p. 140.
The orange tip replaced by very pale saffron-yellow.

(1935-36) 1936

ab. ochracea Szlzl. Iris ~~1935~~ 49. p. 159..
The orange tip replaced by ochre-yellow.

ab. salmonea Oberthur. Lep. Comp. 1909. 3. p. 140.
The orange tip replaced by rose-salmon.

ab. transvestita Muller. Int. Ent. Z. 1932. 26. p. 155.
The orange tip of the male indicated only by a pale grey shade, giving the appearance of a female.

ab. femininus Bang-Haas. Ent. Z. 1938. 52. p. 177.
The orange tip of the male completely disappeared with the exception of a citron-yellow transverse band which runs from the costa to the tornus, travelling on the inner side of the black discoidal point.
This presumably means the edge of the normal orange tip.

ab. deaurata Williams. (nom. nov. pro. decolorata Williams) Ent. Gaz. 1959. 10. p. 138.
= decolorata Williams. (nom. preoc. Caruel 1955). Proc. S. Lond. Ent. & N. Hist. Soc. (1957)
Male with no trace of the normal orange tip. 1958. p. 85; pl. 5, f. 1.

ab. detera Verity. Rhop. Pal. 1908. p. 191.
The orange tip of the male practically absent.
Possibly the same as femininus B.-Haas, Verity does not say that vestiges remain.

ab. flavida-virescens Oberthur. Lep. Comp. 1910. 3. p. 140.
The orange tip replaced by greenish-yellow.

ab. lasthenia Williere. Ann. Soc. Linn. Lyon. 1860. (Extract) Icon d. Chenilles Lep. p. 174 pl. 10
Male albino. The black apical tip and discoidal spot replaced by whitish, the orange patch normal. On the underside the hindwings are marbled with faint greenish-yellow with no black pigment intermixed.

ab. buschmanni Muller. Int. Ent. Z. 1930. 24. p. 153. fig. 154.
Male. The usually orange-red marginal half of the upperside of the forewings is yellowish-brown but the greater part is dusted over with black. On the underside the same area is deep black-brown. Hindwings underside with dark green markings.

ab. reducta Masowicz. Polsk. Pismo. Ent. 1926. 2. p. 124. fig. 1.
Male in which the orange tip is interrupted by parallel whitish stripes along the nervures.

ab. umbrosa Culot. Bull. Soc. Lep. Gen. 1905. 1. p. 69. pl. 1. f. 1.

= marginata Pionneau. (nom. preoc. Greer) Proc. Verb. Soc. Linn. Bord. 19-7. 76. p. 98.

Male with a line of black shading between the orange patch and the white ground, on the upperside of the forewings.

ab. turritis Ochsenheimer. Schmett. Eur. 1816. 4. p. 156.

= hesperidis Newnham. Ent. Rec. 1894. 5. p. 97 & 219.

Very small, and distinguished by the black central spot on the forewing in the ♂ being situated on the edge of the orange patch, instead of in the orange as in typical cardamines; ♀♀ also small.

Newnham's hesperidis would seem to be identical to turritis Ochs. He says it differs from turritis Ochs. by its smaller size, so was apparently unaware that turritis was "very small".

This form is not entirely confined to very small specimens; we have a few ♂♂ in the R.-C.-K. Collection which are of normal size.

ab. divisa Sheljuzhko. Mitt. Munch. Ent. Ges. 1925. 15. p. 97.

The discoidal spot of the forewings divided into two.

ab. parvipuncta Turati. Nat. Sic. 1919. p. 217.

The discoidal spot of the forewings in the shape of a fine comma.

ab. antiquicunx Bryk. Ent. Tijdschr. 1923. 44. p. 109.

The discoidal spot of the forewings reduced to a small speck.

ab. immaculata Pabst. Ber. Nat. Ges. Chemnitz. 1884. p. 16.

The discoidal spot of the forewings completely absent.

ab. crassipuncta Mezger. Lamb. 1931. 31. p. 115.

The discoidal spot of the forewings very large.

ab. macula-punctata Frohawk. Vars. Brit. Butts. 1938. p. 171. pl. 41. f. 4.

Female with large distorted discoidal spot on the forewings with two short points or streaks on its outer edge and one on its inner edge pointing towards the base.

ab. pupillata Lempke. Tijdschr. Ent. 1936. 79. p. 250.

The discoidal spot of the forewings is pupilled.

ab. nigrocellularis Oberthur. Lep. Comp. 1909. 3. p. 141. pl. DIK. f. 17.

Female with the discoidal spot of the forewings drawn out into a long thick streak travelling towards the apex but not reaching it on both upper and underside.

ab. caulotosticta Williams. Trans. Lond. Nat. Hist. Soc. 1915. p. 67.

Female with the discoidal spot of the forewings large and branched, the upper portion extended to the subcostal vein, travelling down it towards the base.

ab. schepdaeli Derenne. Rev. Mens. Soc. Ent. Nam. 1923. 23. p. 45. (fig. Lamb. 29. pl. 1. f. 4.)
Female with the discoidal spot large, the costa black from the base to centre of the wing and linked with the discoidal spot by a black streak, then continuing on to the black apical tip in a thin streak.

ab. costaenigrata Gloss. Int. Ent. Z. 1921. 15. p. 83.

=? *umbratilis* Stephan. Iris 1923. 37. p. 29.

= *nigroconjuncta* Uffeln. Jahresber. Westf. Prov. -ver. Wiss. Kunst. 1926. .p. 161.
The costal edge of the upperside of the forewings heavily dusted with black from the base to beyond the centre.

ab. williamsi Greer. Ent. Rec. 1928. 40. p. 33.

Female with the costa of the forewings black from the base right to the apical black tip, so wide that it connects with the upper edge of the black discoidal spot, giving the appearance of a broad stripe.

ab. decolorata Caruel. Rev. Fr. Lep. 1955. 15. p. 22; fig'd. Oberth. Lep. Comp. 17, pl. 508, f. 4256.
Female in which the usual black parts (discoidal spot and apical tip) are replaced by pale grey.

Caruel says this form is figured by Oberthur, and erroneously named by him as *ab. lasthenia* Mill.; Caruel's statement is correct, since in *lasthenia* there is no trace of grey on the discoidal, nor at the apex.

ab. lineata Lempke. Tijdschr. Ent. 1953. 96. p. 475.

Female in which the dark apical tip of the forewings is reduced to a few lines along the nervures.

ab. quadripunctata Fuchs. Jahrb. Nass. Ver. Nat. 1898. 51. p. 203.

On the upperside of the hindwings there is a black discoidal spot. Normally there is only one on the forewings. On the underside the hindwings show a large spot surrounded by green scaling.

ab. marginemaculata Stephan. Iris. 1920. 37. p. 29.

On the upperside of the hindwings the dots or spots on the margin are well marked.

ab. sagittata Caruel. Rev. Fr. Lep. 1955. 15. p. 41.

Male. On the upperside of the forewings two black streaks from the margin run along the inner margin, towards the base. These streaks start just above the anal angle.

ab. striata Pionneau. Misc. Ent. 1924. 27. p. 57.

= *radians* Verity. Cat. Lep. Gironde 1928. p. 22.

At the apex of the orange patch on the upperside of the forewings there are three clearly visible little black rays.

ab. radiata Williams. Trans. Lond. Nat. Hist. Soc. 1915. p. 69.

On the upperside of the forewings at the apex there are a series of black dashes or stripes stretching from the black apical tip towards the discoidal spot. In extreme forms they can even reach it.

ab. marginata Greer. Ent. Rec. 1920. 32. p. 154.

On the upperside of the forewings the small black dots on the margin are united to form a narrow marginal line, from the black tip at the apex down to the tornus. Described from a ♂.

ab. alberti Hoffmann. Das. Nat. Cabinet. 1894. p. 230.
Included as an aberration by some authors, Hoffmann himself thought it to be a different species because it fed on different food-plant.
Male with all the markings more intense and the orange more fiery, the black deeper. The underside of the forewings shaded sulphur-yellow from the base to the orange patch, the hindwings with less white spaces, the green markings covering the greater part and dotted with black.

In error (not cardamines)

ab. flavosignata Closs. Int. Ent. Z. 1921. 15. p. 83.
Talbot in Catalogus Lepidopterorum vol. 23. p. 312 and Verity in his Farf. Diurn. It. 3. p. 146 both include this as a form of E. cardamines in error. It is in fact an aberration of Arctia caja which, on p. 83 of Int. Ent. Z. 15, follows the description of another aberration of cardamines.

ab. minora de Selys. Ann. Soc. Ent. Belg. 1857. 1. p. 6.
= minor Cockerell. Entom. 1889. 22. p. 176.
= minor Mosley. Nat. Journ. Suppl. 1889. p. 6.
Very small specimens. Cockerell says half normal size.

ab. major Tutt. Ent. Rec. 1897. 9. p. 224.
= ampla Pionneau. Misc. Ent. 1930. 32. p. 6.
Very large specimens.

ab. arsenoides Newnham. Lep. Church Stretton. 1900. p. 122.
= andromorpha Verity. Rhop. Pal. 1911. p. 342. (pl. 68 is given, but the insect not fig'd)
Female with partial orange tips. Upperside.
Verity's form was a female with the apex sprinkled with orange scales. Upperside.
These are mixed gynandromorphs.

ab. commaculata Verity. Rhop. Pal. April 1909. p. 191. pl. 38. f. 15.
= commaculata Oberthur. Lep. Comp. June 1909. 3. p. 140.
The underside irregularly spotted with the orange colour of the male.
These may well be treated as synonyms of the preceding, being separated merely because they are underside.

ab. androgyna Newnham. Lep. Church Stretton. 1900. p. 122.
Completely halved gynandromorph. The right side wings female, the left wings male.

subsp. hibernica Williams. Trans. Lond. Nat. Hist. Soc. 1915. p. 71.
The subspecies found in Ireland. Slightly smaller than type, the blackish spots at the ends of the nervures more strongly marked. The male frequently suffused with yellow on the underside of the forewings. The female with the upperside of the hindwings usually strongly suffused with yellow.

ab. *flavescens* Oberthur. Lep. Comp. 1920. 17. p. 56. pl. DIX. f. 4267.

On the underside of the forewings of the male washed with yellow from the base to the orange patch, the apex beyond it also yellow. Upperside of hindwings washed with yellow except the anal area.

ab. *citrona* Wheeler. Butts. Switz. 1903. p. 64.

On the underside of the forewings the ground colour along the inner margin is yellow instead of white. The upperside is normal.

ab. *subtus-flavovenata* Reuss. Int. Ent. Z. 1915. 9. p. 54.

[On the underside of the hindwings the black dusting is lacking, giving the impression of bright yellow marbling. The veins are outlined in yellow.
= *pulverulenta* Mezger Lamb. 1933: 33: p. 208.

ab. *cinerea* Newnham. Ent. Rec. 1890. 1. p. 242.

On the underside the green marbling is replaced by grey.

ab. *kutokovi* Krulikowsky. Rev. Russe Ent. 1909. 8. p. 265.

On the underside of the hindwings little white remains, most of the wings being covered with green scales.

ab. *subflavopicta* Mezger. Lamb. 1931. 31. p. 115.

Female with the underside of the forewings showing irregularly marked areas of yellow, usually between the discoidal spot and external margin.

ab. *dispila* Raynor. Ent. Rec. 1906. 18. p. 298.

= *bimaculata* Muller. Int. Ent. Z. 1928. 22. p. 139.

Female showing on the underside of the forewings a second black spot beneath the discoidal.

ab. *bilineata* Mezger. Lamb. 1933. 33. p. 408. pl. 9. f. 5.

Similar to the preceding but with two spots beneath the discoidal spot on the underside of the forewings, which are in the form of streaks 2 mm. long and parallel.

ab. *substriata* Caruel. Rev. Fr. Lep. 1955. 15. p. 23.

Specimens with three or more extra black spots, or grey, on the underside of the forewings

ab. *discocellularis* Strand. Int. Ent. Z. 1914. 7. p. 323-4. fig.

On the underside of the forewings an extra black spot beneath the discoidal spot and in addition the upperside of the hindwings showing a black discoidal point. A combination of *dispila* Raynor and *quadripunctata* Fuchs, hardly worth a separate name.

ab. andrinde (error). Ent. Rec. 1916. 28. p. 94.

= andderinde cardamines ab. Ent. Rec. 1916. 28. Index p. v.

In the above Entomologist's Record a somewhat amusing series of mistakes occur in a report of an exhibit at a meeting of the London Natural History Society., copied from the original report in Trans. London. Nat. Hist. Soc. (1915) 1916. p. 17.

This report in the Ent. Rec. reads --"Mr. E. V. Shaw, a series of *E. cardamines*, including large and small spotless forms in both sexes, a female with the orange patch heavily rayed with black, a male with with the orange patch rayed with white between the veins (andrinde). " Later, in the Index, this "andrinde" is called andderinde cardamine ab.

Looking up the original report in Trans. Lond. Nat. Hist. Soc. it reads --" Mr. E. V. Shaw, a series of *E. cardamines* including large and small spotted forms in both sexes, a male with the orange patch heavily rayed with black, a male with the orange patch rayed with white between the veins (underside) etc.

The mistakes in the Ent. Rec. are underlined, also the correct terms used in the original report. The names andrinde, a mistake for underside, and andderinde in the Index, a further misspelling, cannot stand as names since they are obvious errors. The "spotless" is also a mistake, the original reading "spotted".

INDEX

| | | | | | |
|--|----|---|----|--|----|
| <i>aegra</i> Vty. | 3. | <i>flava</i> Husz. | 1. | <i>macropuncta</i> Finke. | 6. |
| <i>alba</i> Der. | 6. | <i>flavida</i> Grub. | 2. | <i>major</i> Car. | 7. |
| <i>albescens</i> Metschl. | 1. | <i>flavoapicalis</i> Metschl. | 3. | <i>melaina</i> Mück. | 3. |
| <i>albinotica</i> Goods. | 2. | <i>flavofasciata</i> Lamb. | 4. | <i>melanina</i> Vty. | 5. |
| <i>alboradiata</i> Herz. | 3. | <i>flavofasciata-</i> <i>crassipuncta</i> Le Ch. | 4. | <i>melaertsi</i> Lamb. | 7. |
| <i>appendiculata</i> Vty. | 8. | <i>flavopupillata</i> Soja. | 6. | <i>metschli</i> Grub. | 5. |
| <i>apicata</i> Tutt. | 3. | <i>flavoradiata</i> Metschl. | 3. | <i>minor</i> Ksien. | 7. |
| <i>argentea</i> Fritsch. | 2. | <i>flavoradiata</i> Osth. | 3. | <i>minor</i> van Mell. | 7. |
| <i>argyphea</i> Lowe. | 8. | <i>flavoradiata</i> Stein. | 3. | <i>minor</i> Vorbr. | 7. |
| <i>atava</i> Reutti. | 2. | <i>fulvocomma</i> Krul. | 1. | | |
| <i>ater-marginata</i> Froh. | 5. | | | <i>nigriformis</i> Finke. | 5. |
| | | <i>galvagnii</i> Staud. | 3. | <i>nigripuncta</i> Car. | 6. |
| <i>bipupillata</i> Cab. | 6. | <i>gartneri</i> Skala. | 2. | <i>nigrofasciata</i> Gr.-Gr. | 5. |
| <i>brabantica</i> Strand. | 1. | <i>goriciana</i> Fritsch. | 6. | | |
| <i>brevis</i> Crombr. | 3. | <i>griseoapicata</i> Herz. | 3. | <i>obsoleta</i> Tutt. | 3. |
| | | | | <i>ocellata</i> Dufr. | 6. |
| <i>canarina</i> Staud. | 1. | <i>heliceides</i> de Selys. | 2. | <i>ochro-cretacea</i> Fritsch. | 2. |
| <i>candida</i> Der. | 6. | | | <i>omnimarginata</i> Hafn. | 5. |
| <i>cleopatra</i> Lat. | 1. | | | <i>opposita</i> Zus. | 8. |
| <i>crassipuncta</i> , see <i>flavofasciata-crassipuncta</i> | 4. | <i>immaculata</i> Der. | 3. | | |
| <i>croceo-expansa</i> Car. | 7. | <i>impunctata</i> Rocci. | 8. | <i>pallescent</i> see <i>albescens</i> | 1. |
| | | <i>infrastrata</i> Lpke. | 8. | <i>pallida</i> Ckll. | 1. |
| <i>deannulata</i> Rocci. | 8. | <i>inornatura</i> Der. | 4. | <i>pallida</i> Robs. & Gard. | 1. |
| <i>deaura</i> Herz. | 7. | <i>intermedia</i> Tutt. | 4. | <i>pallida</i> Tutt. | 6. |
| <i>demarginata</i> Nitsche. | 8. | <i>inversa</i> Alph. | 1. | <i>pallidior</i> Ckll. | 6. |
| <i>duplex</i> Ksien. | 4. | | | <i>parisiensis</i> Oberth. | 4. |
| | | <i>junior</i> Geest. | 1. | <i>parvipuncta</i> Lpke. | 6. |
| <i>elongata</i> Vorbr. | 6. | | | <i>polonica</i> Sitow. | 5. |
| <i>emarginata</i> Rbb. | 3. | <i>lactea</i> Uffel. | 1. | <i>posticomina</i> Lpke. | 7. |
| <i>expicta</i> Jach. | 2. | | | <i>postrema</i> Rocci. | 8. |
| | | | | <i>pseudohelice</i> Metschl. | 2. |
| | | | | <i>pupillata</i> Lpke. | 6. |
| | | | | <i>pygmaea</i> Lamb. | 7. |

INDEX (cont'd.)

| | |
|--------------------------------|----|
| radiata Geest. | 5. |
| radiiformis Schultz. | 8. |
| roseomaculata Nicul. no descr. | 5 |
| rufa Vty. | 8. |
| sagittata Schnaid. no descr. | 7 |
| schonfeldi Metzn. | 4. |
| seriata Rocci. | 8. |
| sieversoides Vty. | 4. |
| simplex Grub. | 3. |
| simplex Neub. | 3. |
| striata Rom. no descr. | 7 |
| striata Zus. | 4. |
| submarginata Finke. | 4. |
| subobsoleta Pionn. | 4. |
| sufflava Vty. | 3. |
| trimaculata Stein. | 6. |
| uhli Kovats. | 5. |
| unimaculata Rom. no descr. | 7. |
| unimaculata Tutt. | 6. |
| venata Lpke. | 5. |
| viridescens Sloper. | 8. |
| viridis van Mell. | 2. |

ab.viridis Van Mellaerts. Lamb.1926.26.p.84.

Female with the ground colour greenish, the typical form being tinted with yellow. Mellaerts considered the type to be the yellow form.

ab.ochro-cretacea Fritsch. Ent.Rundsch.1918.35.p.6.

Female analogous to *Colias palaeno* ab.cretacea. The wings chalky dusted and the colour, especially on the forewings, duller and more sombre, not greenish-white or yellowish-white but of a slight ochre tint as if some of the colour of the 8 shaped discoidal spot of the hindwings (ochre-yellow) had overflowed into the general colour. The black apex of the forewings is also much more matt and duller.

ab.expicta Jachontov. Mos Diurnes 1935.p.119.

Females which are whitish faintly tinted with orange.

ab.flavida Gruber. Ent. Z.1932.46.p.195. Gruber pl.f.14.

Female. The figure shows the wings with normal whitish ground colour except at the margin of the forewings where at the tornus it is strongly yellow as are also the spots enclosed in the black marginal band.

ab.heliceides de Gelys. Enum.1844.no.6.p.20.

= pseudohelice Metschl. Mitt.Munch Ent.Ges.1922.14.p.6.

A small female with the ground colour greenish-white like ab.helice of *C.croceus*. The spotted black border thicker and not descending to the inner margin as in helice. The base of the forewings and greater part of the hindwings, except the spots in the marginal band, are powdered greenish-grey like helice, and the discoidal spot of the forewings is large. Size 36 mm.

Metschl's pseudohelice would appear to be of the same form but of normal size. The wings yellowish-white with heavy black marginal and submarginal spots on all wings, the base of the forewings heavily dusted with blackish. Hindwings, with the exception of the anal fold, completely dusted blackish-grey.

The main character would appear to be the darkened hindwings giving the appearance of helice.

ab.argentea Fritsche. Ent.Rundsch.1913.30.p.46.

Female. Wings flat silvery white without any trace of the yellow tint. Hindwings powdered with grey, towards the base blue-grey, the discoidal spot is white as snow instead of the normal orange and the fringes white without a trace of the usual rose colour.

ab.albinotica Goodson. Ent.Gaz.1960.11.p.18. (fig. Frohawk Nat.H.Brit. Butts.pl.9.f.26)
Albino. All black patterning replaced by very pale silvery lilac-grey, the pink fringes showing in contrast.

ab.atava Reutti. Lep.Faun.Baden.1898.Ed.2.p.19. (fig. Lamb.33.p.19.)

= gartneri Skala. Verh.Naturf.Ver.Brunn.1913.51.p.96.

All wings of a brownish-grey, unicolorous, without a black border, the discoidal spots showing faintly darker.

I have not seen the original description but Lempke in Lamb.36.p.78. gives it with gartneri as a synonym. He also includes the following ab.melaina Much but by its description this would appear to be a much blacker form, not brown-grey, so it is separated here. Skala first described his gartneri under *C.myrmidone* but corrected it later.

hyale Linnaeus. Syst. Nat. 1758. L. n. 469.

aberrational forms etc.

ab. albescens Metschl. Mitt. Münch. Ent. Ges. 1922. 12. p. 6. (fig. Ent. 1. 46. Gruber pl. f. 4.)
Male with the ground colour like that of the female, rather pale yellowish.
Verity states that Bollow in Seitz Macrolep. is wrong in calling this form albescens and that it should be pallescens. This is not so, the original description bears the name albescens.

ab. junior Geest. Z. Wiss. Ins. Biol. 1905. 1. p. 380.
= fulvocoma Krulikowsky. Rev. Russe Ent. 1907. 7. p. 29.
Washed with orange-red in the centre of the wings.
Krulikowsky's fulvocoma was a male with pale orange upperside.

ab. cleopatra Latier. Proc. Verb. Soc. Linn. Bord. (1934) 1935. 86. p. 149.
Instead of the normal yellow-green the wings are of a warmer colour, the upperside washed with orange, intensified on the nervures. On the underside the hindwings washed with rose-colour, the discoidal spot being coppery-red, not pearly.

♀ ab. pallida Robson & Gardner. Young Nat. Suppl. 1886. p. 1. (see Mosley Nat. Journ. Am. 3. p. 4)
(See Cockerell Entom. 45. p. 323. sex of pallida is ♀.)
= pallida Cockerell. Entom. 1889. 22. p. 4. from Entom. XI. p. 51.
= lactea Uffeln. Jahrb. Westf. Prov. Ver. Wiss. 1926. 51-52. Sep. p. 6.
The original description merely says whitish-yellow..
Cockerell in Entom. 45. p. 323 says that the name pallida was used by Robson & Gardner for the light form of the female, properly the typical form.
This then is for the whitish or cream form of the female which appears to be more plentiful than the yellow coloured examples. These are named ab. flava Husz.
The colour of the typical female seems in complete doubt, some authors declaring the white form the type and others the yellow form. Both forms are left under their separate names in these notes although one of them must be the type form and only one of them an aberration.

ab. flava Husz. Esperj. Ker. Coll. 1881. p. 34.
= inversa Alpheraky. Hor. Soc. Ent. Ross. 1881. 16. p. 434.
Female with the ground colour yellow as in the male.
The authors of these two names obviously take the type form as being the light or whitish one.

ab. canarina Stauder. Mitt. Münch. Ent. Ges. 1922. 12. p. 25.
An extreme form of ab. inversa Alpheraky, with the ground colour deep yellow like the yolk of an egg. Female form.

♀ ab. brabantica Strand. Ent. 1. 1912. 25. p. 253. (from fig. in Tijdschr. Ent. 48. pl. 2. f. 1.)
Very small size with yellow colouring and only separable from the preceding by its size. Strand gives a lengthy description of the figure, most of the details applying to a typical male, indeed the figure looks extremely like a male, possibly the reason for its being figured.

3.

ab.melaina Mück. Ent. 1.1919.35.p.35.

Upperside of all wings unicolorous dark with a suggestion of dull indigo. The thorax, and abdomen completely black, the costa, fringes and antennae red, forming a striking contrast. The discoidal spots show faintly darker. The specimen when first seen was thought to be a *A. hyperantus*.

This would appear to be darker than the preceding if it looked like *hyperantus*.

ab.aegra Verity. Farf.Diurn.It.1947.3.p.262.pl.34.f.29.

The figure shows irregular black marks, streaks and spots in the centre of the left forewing.

Most probably pathological and not worthy of a name.

ab.sufflava Verity. Farf.Diurn.It.1947.3.p.362.pl.34.f.38.

The pigment of the black border and pattern of the wings is incompletely light blonde, merging into grey.

This also would seem to be pathological if the "blonde" is incomplete.

ab.flavoradiata Osthelder. Schmiett. Sudbayern.1925.p.67. (fig.Lamb.36.pl.3.f.4.)

= *flavoradiata* Metschl. (nom.nud.) Mitt.Munch Ent.Ges.1922.12.p.6.

= *flavoradiata* Steiner. Int.Ent. 2.1935.29.p.269.

The black border of the forewings is intersected by yellow veins.

ab.alboradiata Herzig. Int.Ent. 2.1935.29.p.365.

Female form. Like the preceding *flavoradiata* but the intersecting veins in the black border of the forewings white, the same tint as the ground colour.

ab.galvagnii Stauder. Z.Wiss.Ins.Biol.1921.16.p.150.fig.11.descript.p.220.

= *flavoapicalis* Metschl. Mitt.Munch Ent.Ges.1922.12.p.7.

= *griseoapicata* Herzig. Int.Ent. 2.1935.29.p.365.

The apical and entire marginal marking of the forewings is not black but black mixed with intermittent yellow dusting. As a result a brownish effect is produced. In the female it is not so pronounced as in the male.

Metschl's *flavoapicalis* had the apex of the forewings heavily dusted with yellow.

Herzig's *griseoapicata* had the submarginal part of the black band normal but the marginal part so covered with yellow scales that it appears greenish-grey. The form usually has a squarish look.

These forms all have the same character, the black marginal band dusted with yellow scales. The squarish look of *griseoapicata* makes it possible that it belongs to *Colias calida*.

ab.apicata Tutt. Brit.Butts.1896.p.253.

= *brevis* Crombrughe. Rev.Mens.Ent.Soc.Nam.1911.p.104.

= *simplex* Grüber. (nec. Neuberg.) Ent.Z.1932.46.p.194. Gruber pl.fig.3.

With an apical "tip" to the forewings instead of a complete black band.

The black border is thus much abbreviated, the lower part being absent.

The form *brevis* had the black marginal band very short, ceasing before the first median branch.

Gruber's *simplex* on his coloured plate shows this same character. In his text he calls it *simplex* Neuburger but this was for hindwings with no band at all. Gruber's form could be separated from these others since it is for forewings as well as hindwings but the name would be preoccupied by Neuburger.

ab.obsoleta Tutt. Brit.Butts.1896.p.253.

= *simplex* Neuburger. Soc.Ent.1905.20.p.42.

= *emarginata* Röber. Seitz Macrolep.1907.1.p.65.

= *immaculata* Derenne. Rev.Mens.Soc.Ent.Nam.1925.25.p.32.

The black marginal markings of the hindwings completely absent.

ab. subobsoleta Pionneau. Echange 1936. 52. no. 464. p. 23.

The black spot markings of the marginal band of the hindwings have almost disappeared, in obsoleta Tutt they are completely absent.

ab. intermedia Tutt. Brit. Butts. 1896. p. 253.

Only the outer series of black spots showing on the margin of the hindwings.

ab. duplex Ksienchopolsky. Trd. Obseizl. Volyni. 1911. 8. p. 28. pl. 1. f. 2.

Hindwings with a black marginal band and a series of submarginal spots.

Tutt says this is the typical form although Linnaeus does not mention such spots.

ab. schonfeldi Metzner. Ent. Anz. 1926. 6. p. 18.

= submarginata Fiske. Int. Ent. 1. 1934. 28. p. 394.

The submarginal black band of the hindwings is exceptionally heavy.

ab. inornatura Derenne. Rev. Mens. Soc. Ent. Nam. 1923. 23. p. p. 39. (fig. Lamb. 50. pl. 8. f. 4.)

The black marginal markings of the forewings are very much reduced, almost absent. On the hindwings there are no black marking at all.

ab. sieversoides Verity. Rhop. Pal. 1908. p. 221. pl. 40. f. 34. (Lamb. 56. pl. 4. f. 4. fig.)

The outer part of the marginal band of the forewings completely absent and there are no black marginal marks on the hindwings.

ab. parisiensis Oberthur. Lamb. 1936. 36. p. 90. pl. 6. f. 1.

The outer markings of the black band bordering the forewings are only feebly indicated.

The figure shows only blackish wedge-shaped marks at the ends of the veins instead of the complete border. The inner part of the band is present but somewhat narrower than usual. The hindwings show a few traces of the marginal band. The form is transitional to sieversoides Verity.

ab. striata Zusanek. Z. Ost. Ent. Ver. 1912. 3. p. 36.

At the apex of the forewings the yellow submarginal spots are so enlarged towards the centre of the band that the inner portion of the band has almost completely disappeared. The nervures of the forewings are powdered with black towards the centre.

ab. flavofasciata Lambillion. Cat. Lep. Belg. 1907. addenda p. 409. (fig. Lamb. 30. pl. 8. f. 1.)

The yellow apical and marginal spots are all united into a broad, well-defined, yellow band, cutting the normal black border into two parts from the costa downwards.

ab. flavofasciata-crassipuncta Le Charles. Bull. Soc. Ent. Fr. 1927. p. 138. fig.

Like the preceding flavofasciata with the black border of the forewings cut into two parts by a yellow band but in addition the hindwings show the same character. Thus the yellow band is continuous from the costa of the forewings right down to anal angle of the hindwings. Also in addition the discoidal spot of the forewings is enormously enlarged and elongated, 3mm. in height and 1.75 mm. in width.

ab. nigrofasciata Grun Grshimailo. Mem. Rom. 1885. 1. p. 163. (fig. Lamb. 36. pl. 7. f. 1-4)
A black bar extends from the discoidal spot as far as the marginal band into which it passes. The marginal band is very strongly developed and extends almost to the centre of the forewings. These appear more striking because the marginal band of the hindwings is completely lacking. On the underside the margin is rayed or streaked, the rays pointing towards the base.

ab. metschli Gruber. Ent. Z. 1932. 46. p. 195. Gruber pl. f. 15.
On the forewings the black marginal band is extended in two streaks as far as the discoidal spot, other streaks almost reaching it. Hindwings with no black marginal band.

ab. radiata Geest. Z. Wiss. Ins. Biol. 1905. 1. p. 379.
The black interneural spots elongated into long black streaks towards the discoidal spot on both fore and hindwings, upperside and underside.

ab. polonica Sitow. Bull. Int. Sci. Cracow. 1913. B. p. 214. fig.
On the upperside of the forewings a great extension of the dark border into the disc. On the hindwings the border is entirely absent. On the underside there is a suffusion of dark scales over the light areas.

ab. venata Lempke. Lamb. 1936. 36. p. 76.
All the nervures are blackened throughout their whole length.

ab. ater-marginata Frohawk. Vars. Brit. Butts. 1938. p. 175. pl. 42. f. 3.
The black marginal border of the forewings shows only a trace of one single yellow spot which is situated near the apex and so suffused with dark scales that it is almost imperceptible.
Transitional and practically the same as the following *uhli* Kovats.

ab. uhli Kovats. Ent. Z. 1899. 12. p. 169. (fig. Lamb. 30. pl. 8. f. 5.)
The black marginal border of the forewings is of a profound black and contains no yellow spots.

ab. melanina Verity. Rhop. Pal. 1908. p. 223.
On the upperside of the forewings the spots in the black marginal band are imperceptible and the discoidal spot is large, the veins dark scaled. On the hindwings the discoidal spot is black.

ab. omnimarginata Hafner. Carniola 1912. p. 221. pl. 3. f. 41.
Hindwings with a broad black marginal band which extends from the costa right down to the anal angle.
This would seem to be more extreme than *ab. schonfeldi* Metzner.

ab. nigriformis Finke. Int. Ent. Z. 1934. 28. p. 394.
The basal areas strongly powdered, this powdering in extreme cases extending in dusky rays which reach the centre of the wings or beyond.

ab. macropuncta Finke. Int. Ent. Z. 1934. 28. p. 393.

The upperside of the forewings with a specially large discoidal spot.

ab. pupillata Lempke. Lamb. 1936. 36. p. 103.

= *ocellata* Dufrane. Bull. Soc. Ent. Belg. 1947. 83. p. 70.

On the forewings the median spot is pupilled on both the upper and underside. The pupil is usually whitish or pale orange.

ab. flavopupillata Soja. Verh. zool.-bot. Ges. Wien. 1930. 79. p. (107).

On the forewings the discoidal spot is orange instead of black. On the underside it is black with a yellow centre.

ab. parvipuncta Lempke. Tijdschr. Ent. 1954. 91. p. 304.

On the forewings the discoidal spot is small.

ab. pallidior Cockerell. (nom. nov. pro. *pallida* Tutt.) Entom. 1912. 45. p. 523.

= *pallida* Tutt. (nom. preoc. Robs. & Gard. 1886) Brit. Butts. 1896. p. 253.

On the hindwings the central (discoidal) spot is almost obsolete.

It is not stated whether this applies to upper and underside, the aberrations preceding it on the same page are for uppersides.

ab. unimaculata Tutt. Brit. Butts. 1896. p. 253.

On the hindwings the discoidal spot consists of a single orange spot instead of the usual two.

ab. candida Derenne. (nom. nov. pro. *alba* Derenne) Lamb. 1936. 36. p. 123.

= *alba* Derenne. (nom. preoc. Ruhl. 1892). Lamb. 1933. 33. p. 184. pl. 9. f. 4.

The discoidal spot of the hindwings is white on both upper and underside.

ab. nigripuncta Caruel. Rev. Fr. Lep. 1955. 15. p. 27.

On the hindwings the orange discoidal spot shows a few black scales.

ab. bipupillata Cabeau. Rev. Mens. Soc. Ent. Nam. 1922. 22. p. 54. (fig. Lamb. 30. pl. 8. f. 3.)

On the hindwings the orange spot is divided completely into two separate pupils. normally these are connected.

ab. trimaculata Steiner. Int. Ent. Z. 1935. 29. p. 269.

On the upperside of the hindwings there is a three-fold central spot.

ab. elongata Vorbrodt. Mitt. Schweiz Ent. Ges. 1917. 12. p. 434. (fig. Lamb. 36. pl. 6. f. 2.)

= *goriciana* Fritsch. Ent. Rundsch. 1918. 35. p. 6.

On the upperside of all wings the discoidal spots are enlarged and elongated to a point on the outer side.

Fritsch's *goriciana* had a gigantic discoidal spot on the forewings which was elongated on its outer side and a considerably larger discoidal on the hindwings elongated width-wise.

ab.deaura Herzig. Int.Ent. 2.1935.29.p.365.

The orange-red surrounds to the orange discoidal spot of the hindwings are entirely absent so that only the light orange centres remain.

This is a very feeble aberration. Normally there is a slight slash of orange outside the lighter centre of the spot.

ab.mellaertsi Lambillion. Rev.Mens. Soc.Ent. Nam.1913.p.126.

Hindwings with the external border(not band)cut in a straight line from the cell to the anal angle and deprived of black spots. The discoidal spot large and of a deep orange-red. The ground colour citron yellow.

It is difficult to know what the first part of this description means, unless it is merely shape.

ab.posticominuta Lempke. Tijdschr.Ent.1954.97.p.307.

The hindwings are smaller because the hindmargin runs in a straight line to the tornus which is therefore much sharper. Corresponds exactly with C.croceus ab. posticominuta Verity so is probably hereditary.

ab.croceo-expansa Caruel. Rev.Fr.Lep.1955.15.p.27.

On the upperside of the hindwings the orange spot has neither precise shape or limits, it escapes in fact from the normal round spot to invade a considerable part of the disc into the colour of which it gradually merges. On the underside the double spot is rose-coloured, sharply rimmed with deep rose and it, too, escapes from its normal limits to diffuse into the ground colour which is rayed with greyish-brown.

ab.major Caruel. Rev.Fr.Lep.1955.15.p.26.

Large specimens around 50 mm.

ab.pygmaea Lambillion. Rev.Mens. Soc.Ent. Nam.1906.p.22. (fig.Lamb.30.pl.8.f.2.)

= minor Vorbrodt. Schmett. Schweiz.1911.1.p.30.

= minor Ksienchopolsky. Rhop. Sud-ouest Russe.1911.p.28.

= minor Mellaerts. Lamb.1926.26.p.84.

Very small specimens, pygmaea being only 30 mm. in expanse which is smaller than the blue Lycaenid icarus.

These forms vary somewhat but it seems useless to separate them into their particular sizes, all being dwarfs.

ab.viridescens Sloper. (in Wheeler) Butts.Switz.1903.p.69.
Females with the underside of the hindwings bluish-green.

ab.postrema Rocci. Atti.Soc.Ligust.Sc.Nat.1920.30.p.29.
Underside of the hindwings strongly covered with dull green.

ab.argypha Lowe. Ent.Rec.1909.21.p.36.
The underside of the hindwings and apex of the forewings entirely greyish-white, very pronounced, instead of the normal mustard-yellow. The greyish-white contrasts slightly with the pure white of the discal area of the forewings. The general result is an almost silver underside.

ab.rufa Verity. Rhop.Pal.1908.p.242.pl.41.f.34.
Female with the underside of a reddish tint.

ab.opposita Zusanek. Z.Ost.Ent.Ver.1918.3.p.36. (fig.Ent.Z.46.coloured plate)
= seriata Rocci. Atti.Soc.Ligust.1920.30.p.30.
On the underside of the forewings the submarginal brown spots are enlarged and more vivid, and there are fawn spots at the ends of the nervures.

ab.impunctata Rocci. Atti.Soc.Ligust.Sc.Nat.1920.30.p.30.
On the underside of the forewings the ferrugineous macules are completely lacking.

ab.demarginata Nitsche. Verh.zool.-bot.Ges.Wien.1913.63.p.21.
On the underside of both fore and hindwings the marginal spots are absent.

ab.infrastriata Lempke. Tijdschr.Ent.1954.97.p.306.
On the underside of the forewings in cell 5 a black horizontal line between the discal spot and dark submarginal spot but reaching neither of them.

ab.radiiformis Schultz. Nyt.Mag.Naturf.1904.42.p.41. (fig.Lamb.36.pl.6
On the underside the ferrugineous spots of both fore and hindwings run into rays, from the submarginal ones, outwards to the border between the nervures, or inwards towards the discoidal spot. Upperside normal.
The names covers all forms which are rayed on the underside only.

ab.appendiculata Verity. Farf.Diurn.It.1947.3.p.260.pl.35.f.13.
On the underside of the hindwings the discoidal spot is prolonged in an appendix towards the base.

ab.deannulata Rocci. Rocci. Atti.Soc.Ligust.Sc.Nat.1920.30.p.30.
On the underside of the hindwings the double silver spot lacks its dark surround with the exception of the thin interior line, i.e.-that which immediately encloses the silver.

calida Verity. Ent. Rec. 1923. 35. Suppl. p. 15. (fig. Rhop. Pal. 1909. pl. 40)

This species, recently separated from *C. hyale*, occurs in England and although very similar in appearance to *hyale*, has more rounded forewings, much less black border on the hindwings and usually a larger orange discoidal spot. A typical example is figured in South's Brit. Butts. pl. 21. f. 1.

The species was first described and named in Ent. Rec. 1916. 28. p. 99 as "the beautiful and very brightly coloured summer generation of Southern Europe" citing as co-types the figures in Verity's Rhop. Pal. 1909. pl. 40. figs. 31 and 36. These are typical of the specimens we have in the Tring Museum captured in Southern England.

Verity raised *calida* to the rank of subspecies in Ent. Rec. 1923. 35. Suppl. p. 15. so, according to the new rules, its specific rank dates from 1923, not 1916 when it was of infrasubspecific rank. The Spring generation, *vernalis* Verity, was originally described as the spring generation of *hyale* but later in his Farfalle Diurn. It. 1947 3. p. 265 declares it *gen. vern.* of *calida* and the figures in Rhop. Pal. show that this is so. *vernalis* is an earlier name than *calida* but cannot be used as it is of infrasubspecific rank whereas *calida* was raised above it in 1923.

Verity names other races of *calida* in his Farfalle, the figures all agreeing with the subtle "look" peculiar to *calida*.

Other authors have used other names for the species such as "*australis*" but in my opinion Verity's *calida* is the only definite one, since his coloured figures are the only conclusive evidence.

INDEX

| | | | | | |
|---------------------------------|-----|-------------------------------|--------|--------------------------------|-----|
| adoratrix Staud. (helice) | 12. | dawsoni Krüg. | 3. | infracerulescens Vty. | 10. |
| aegra Vty. | 8. | deannulata Rocci. | 9. | infralutea Vty. | 9. |
| alba Lpke. (helice) | 11. | decurtata Kitt. | 5. | infraviridis Vty. | 9. |
| albidopupillata Rev. | 7. | dentata Car. | 4. | internodimidiata Rocci. | 6. |
| albissima Rag. (helice) | 11. | derennei Braun. | 5. | iridescens Cost. | 2. |
| amethystina Braun. | 2. | diloui Man. | 4 & 5. | irregulata Dufr. | 3. |
| amethystine Froh. | 2. | divisa Rocci. | 6. | | |
| angustior Ckll. | 7. | duplex Ckll. | 8. | | |
| atrofasciata Rocci. | 3. | | | lacrimans Staud. | 9. |
| aubuissoni Carad. (helice) | 11. | | | latemarginata Lpke. | 3. |
| auriflua Berg. (helice) | 11. | earinica Oberth. | 5. | leucos Berg. (helice) | 11. |
| | | electra Froh. | 1. | lucifer Rich. | 2. |
| | | electra Lew. | 5. | | |
| basisuffusa Lpke. | 3. | enervata Kitt. | 3. | | |
| berioi Dufr. | 3. | | | maculata Lpke. | 4. |
| berthina Braun. (helice) | 11. | | | magnipuncta Lpke. | 6. |
| bicolorata Mezg. | 2. | faillae Stef. | 4. | magnomaculata Lpke. | 10. |
| bimaculata Rocci. | 7. | fischeri Braun. | 10. | major Ckll. | 7. |
| bipupillata Pionn. | 7. | flammea Kitt. | 1. | major Le Ch. | 7. |
| breignetti Man. | 1. | flavida Ksien. (helice) | 11. | marginata Braun. (croceus) | 6. |
| brunnea Tutt. | 3. | flavomaculata Braun. (helice) | 11. | marginata Braun. (helice) | 12. |
| | | fulvosignata Rocci. | 6. | megei E.-B. | 6. |
| | | | | melanitica Vty. | 2. |
| caerulea Drag.-Rabenh. (helice) | 12. | | | micans Fritsch. | 2. |
| caerulea Vty. (helice) | 12. | geisleri Bryk. | 9. | micans Kief. | 2. |
| crysothema Steph. (nec Esp.) | 1. | gigantea Braun. | 7. | micans Konas. | 2. |
| crysothemiformis Vty. | 1. | grisandroconiata Lpke. | 8. | minor Ckll. | 7. |
| cincta Le Ch. | 7. | | | minor Faill. | 7. |
| cinerascens Row.-Br. | 4. | | | minor Pionn. (helice) | 12. |
| circumiens Boll. | 7. | helena H.-S. | 7. | minoris Staud. | 2. |
| completa Lpke. | 6. | helice Hübn. | 11. | myrmidoneformis Grub. (helice) | 12. |
| crassesignata Kitt. | 5. | helicina Oberth. (helice) | 11. | myrmidonides Staud. (helice) | 12. |
| cremonae B.-Haas. | 1. | helicinoides Braun. | 1. | | |
| cremonae Vty. | 1. | helicoides Sag. | 8. | | |
| | | henriettae Pionn. | 1. | | |
| | | hyerensis Strand. | 5. | | |

INDEX (cont'd.)

| | | | | | |
|---------------------------|--------|-------------------------------|-----|-----------------------------|-----|
| naieri Heinr. | 3. | radiata Man. | 3. | unimaculata Kitt. | 9. |
| nervosa Pionn. | 3. | radiata Nitsche. | 6. | unimaculata Pionn. | 8. |
| niediecki Strand. | 9. | regressa Vty. | 7. | | |
| nigra Aign. (helice) | 11. | reisseri Agenjo. | 8. | | |
| nigrofasciata Braun. | 3. | retracta Kitt. | 3. | velata Rag. | 4. |
| nigrofasciata Man. | 4 & 5. | retronigra Delah. | 1. | | |
| nigrofasciata Maur. | 5. | riducula Alph. (helice) | 12. | | |
| nigrofasciata Vty. | 3. | riviericola Strand. | 2. | xanthina Berg. (helice) | 11. |
| nigrosarsata Lpke. | 2. | roseosatura Vty. | 9. | xanthostigma Staud. | 7. |
| | | rubroandroconiata Obrazt. | 6. | | |
| | | rufomaculata Lpke. | 9. | | |
| oberthuri Braun. (helice) | 11. | rutilans Man. | 1. | zuellichi Nitsche. (helice) | 11. |
| oberthuri Pionn. | 1. | | | | |
| obsoleta Grub. | 5. | | | | |
| obsoleta Tutt. | 5. | saturatior Kitt. | 6. | | |
| | | schirberi Oberth. | 4. | | |
| | | semidemarginata Pionn. | 9. | | |
| pallida Grub. (helice) | 11. | semidivisa Rocci. (helice) | 12. | | |
| pallida Man. | 1. | semiobsoleta Rocci. | 5. | | |
| pallida Staud. (helice) | 11. | seriata Pionn. (helice) | 12. | | |
| pallida Tutt. (helice) | 11. | seriata Rocci. | 9. | | |
| parvipuncta Lpke. | 6. | somnambula Bryk. (helice) | 11. | | |
| passa Vty. | 3. | striata Geest. | 3. | | |
| pavelli Aign. | 5. | subflavescens Pionn. (helice) | 11. | | |
| perpallida Man. | 1. | subhelicina Man. (helice) | 11. | | |
| plurimaculata Mezg. | 9. | subobsoleta Rocci. | 5. | | |
| posteropseudomas Kraut. | 5. | subpallida Man. | 1. | | |
| posticominuta Vty. | 7. | subtuscuneata Galv. | 9. | | |
| posticotersior Vty. | 2. | subviridis Man. | 4. | | |
| pseudomas Ckll. | 5. | suffusa Ckll. | 2. | | |
| pullata Heinr. (helice) | 12. | suffusa Tutt. | 3. | | |
| punctellata Braun. | 6. | | | | |
| punctifera Braun. | 6. | | | | |
| pupillata Rev. | 7. | tenuimarginata Lpke. | 4. | | |
| purpurascens Ckll. | 2. | tergestina Staud. | 1. | | |
| pyrenaica Gr.-Gr. | 7. | turbida Braun. | 5. | | |

croceus Fourcroy. Ent. Paris. 1785. 2. p. 250.
= edusa Fabricius. Mant. Ins. 1787. 2. p. 23.

Aberrational forms etc.

ab. chrysotheme Stephens. Ill. Brit. Ent. Haust. 1827. 1. p. 11. pl. 2. f. 1.

= chrysothemeformis Verity. Ent. Rec. 1919. 31. p. 87.

Stephens thought his specimen to be the Continental species of that name, the author of which was Esper. It was a male of smaller size and paler than *C. edusa*, other differences according to Stephens were the rotundity of the hindmargin of the forewings, the dissimilar form of the marginal band and expanded duskiness at the base of the wings, especially the hindwings, etc. The coloured figure seems to be nothing more than a slightly smaller than usual croceus.

Verity's chrysothemeformis was "identical with chrysotheme Esper except for the patch of androconial scales in the male." chrysotheme does not have these.

The form can hardly be classed as an aberration, it is best not to use the name.

ab. cremonae Verity. Rhop. Pal. 1911. p. 358. (fig. Iris 1915. pl. 10. f. 4.)

= cremonae Bang-Haas. Iris. 1912. 26. p. 103.

= tergestina Stauder. Boll. Adriat. 1913. p. 149. fig.

= oberthuri Pionneau. (nom. preoc. Braun.) Echange. 1924. 39. no. 416. p. 23.

= henriettae Pionneau. (nom. nov. pro. oberthuri Pionn.) Echange 1926. 42. no. 423. p. 2.

= pallida Manon. Proc. Verb. Soc. Linn. Bord. 1926. 77. p. 147.

= perpallida Manon. Proc. Verb. Soc. Linn. Bord. 1927. 79. p. 26.

= helicinoides Braun. Lamb. 1930. 30. p. 9.

These are all forms of the male in which the ground colour is of a decided yellow instead of the normal orange. They vary in tint from sulphur-yellow to greenish-yellow but since it is almost impossible to know exactly what shade the author meant they are included under the oldest name, ab. cremonae Verity, which was a male with the ground colour greenish-yellow. Bang-Haas gave the same name and colour. tergestina Stauder was sulphur-yellow, sometimes citron-yellow (green tinted) in both the males and females.

pallida Manon and perpallida Manon were males of this same colour.

As regards henriettae=oberthuri Pionneau described it from the specimen mentioned by Oberthur in Lep. Comp. 3. p. 174. no. 4, which was a male, very pale yellow. Pionneau however sent a co-type to Lempke (see Lamb. 33. p. 62) which was very little lighter than typical croceus and in Lempke's opinion not worthy of a name. Pionneau's original description, the one given by Oberthur, must however be taken, very pale yellow and his selection of such a co-type seems strange.

ab. subpallida Manon. Proc. Verb. Soc. Linn. Bord. 1926. 77. p. 147.

The ground colour a little paler than typical croceus.

♂ ab. breignetti Manon. Proc. Verb. Soc. Linn. Bord. 1927. 79. p. 26-27.

The forewings the colour of light chrome or more the colour of mastic, the hindwings of normal colour.

ab. flammea Kitt. Z. Ost. Ent. Ver. 1924. 9. p. 18.

= rutilans Manon. Proc. Verb. Soc. Linn. Bord. 1926. 77. p. 146.

The ground colour rich fiery orange-yellow.

ab. retronigra Delahaye. Suppl. Cat. Lep. Maine-et-Loire. 1909. p. 9.

= electra Frohawk. (nom. preoc. Lewin). Vars. Brit. Butts. 1938. p. 179.

Hindwings almost completely black.

Frohawk's electra had the hindwings densely greenish-black. The forewings normal.

ab.purpurascens Cockerell. Entom.1889.22.p.3. (from Entom.11.p.51)

= micans Fritsch. Int.Ent. 7.1911.5.p.55.

= micans Kiefer. Ent.Rundsch.1913.30.p.321.

= micans Konas. Iris 1914.28.p.17.

= iridescens Costantini. Atti.Soc.Modona.1916.Ser.5.vol14.p.14.

= riviericola Strand. Arch.Naturg.1927.91.A 12.p.281.

= amethystina Braun. Lamb.1930.30.p.9.

= amethystine Frohawk. Vars.Brit.Butts.1938.p.179.

The wings beautifully shot with purple or blue or violet.

These various forms all stress this iridescence, either on fore or hindwings or both, so are placed under the one name.

ab.posticotersior Verity. Farf.Diurn.It.1947.3.p.283.pl.36.f.5.

On the upperside of the hindwings the dark dusting is less dense than usual so that the orange shows more like that of the forewings.

ab.bicolorata Mezger. Lamb.1932.32.p.210.

On the forewings the ground colour between the discoidal spot and the margin is yellow but the basal half orange. On the hindwings between the discoidal spot and the margin are four yellow spots encroaching on the grey-green ground colour.

ab.minoris Stauder. Z.Wiss.Ins.Biol.1921.16.p.222.

A small male in which the costa of the forewings is broadly yellow-sulphur to the width of 3 mm..The rest of the wing of normal orange colour.

ab.nigrosarsata Lempke. Tijdschr.Ent.1954.97.p.312.

The whole orange ground colour of the upperside is finely powdered with black scales.

ab.suffusa Cockerell. Entom.1889.22.p.55. (from fig.Entom.11.p.49.)

Melanic. The forewings strongly suffused with black from the marginal band towards the base.

Cockerell cites two figures, quite different in appearance, as belonging to this form, the second one in Newman's Brit.Butts, would appear to be merely stained. His first figure is taken as representing the form and this shows the black marginal band of the forewings extending in tongues towards the base, the main and blackest one stretching from the marginal band, through the discoidal spot, and reaching the base of the wing in the form of a black stripe. Another thinner but complete stripe stretches from the margin to the base a little above the inner margin and between it and the costal stripe there is a wedge-shaped, less black, tongue which reaches the middle of the wing. The hindwings are more or less usual in appearance, with rather large yellow lunules in the margin.

ab.melanitica Verity. Rhop.Pal.1909.p.270.pl.47.g.9.

Very similar to the preceding but slightly more extreme. The figure shows the black marginal band of the forewings extended in a very broad stripe occupying the upper third of the wing, obliterating the discoidal spot and almost reaching the base. In addition there are two further black stripes, much narrower, reaching from the marginal band to the discoidal cell parallel with the inner margin. Hindwings rather devoid of markings apart from a black marginal, abbreviated, band in the costal half.

ab.lucifer Richard. Lamb.1946.46.p.92.

Melanic. All four wings brown black with the exception of the androconial patches of the hindwings. There remain some orange scales in the disc of the forewings, in particular on the nervures. Underside of the forewings the median area brown, the apex orange but all patterns effaced. Underside of hindwings normal.

ab. nigrofasciata Verity. Rhop. Pal. Nov. 1908. (not 1909). p. 469. pl. 47. f. 8.

= naieri Heinrich. Ent. 1. 1930. 43. p. 295. fig.

On the forewings a black wedge or streak travelling from the black marginal band to the discoidal spot.

ab. nervosa Pionneau. Echnge 1929. 54. no. 435. p. 2.

The veins of the forewings black throughout. The ground colour dusted with black.

ab. striata Geest. Z. Wiss. Ins. Biol. 1905. p. 379.

= radiata Manon. Proc. Verb. Soc. Linn. Bord. 1926. 77. p. 149. (fig. Lamb. 30. pl. 2. f. 8.)

On the forewings the black marginal band is extended in rays or streaks to the middle of the wing. These are also present on the underside.

ab. retracta Kitt. Z. Ost. Ent. Ver. 1924. 9. p. 17.

Male. On the forewings the black marginal band extends along the inner margin as far as the middle of the wing or beyond.

ab. irregulata Dufrane. Bull. Soc. Ent. Fr. 1947. 83. p. 73.

Male. On the forewings the black border, instead of being sharp and regular, is prolonged into the disc in the interval 4 by strong black powdering. On the hindwing it is prolonged in the same way in the interval 6.

ab. basisuffusa Lempke. (nom. nov. pro. suffusa Tutt). Ent. Ber. (Amst.) 1932. 8. p. 394.

= suffusa Tutt. (nom. preoc. Cockerell 1889). Brit. Butts. 1896. p. 259.

Female. The base of the forewings strongly suffused with blackish.

ab. dawsoni Kruger. Soc. Ent. 1900. 14. p. 155.

On the forewings the base is suffused with deep black extending outwards in the shape of three fan-like streaks or smears, almost to the middle cell.

ab. nigrofasciata Braun. (nom. preoc. Verity. 1908) Lamb. 1930. 30. p. 8. pl. 2. f. 7.

Braun says that this female form is an extension of Verity's nigrofasciata which was a male and quite distinct from it in my opinion. The figure shows a black strip from the apical part of the marginal black band, travelling down the costa to reach the base, uniform in width and just touching the discoidal spot. The base itself is blackened strongly and forms a three pronged fan-like pattern as in the preceding ab. dawsoni.

Verity's nigrofasciata merely had the marginal band extended in a streak as far as the discoidal, not reaching the base.

ab. latemarginata Lempke. Lamb. 1933. 33. p. 86.

Female. The marginal border much wider than normal, almost reaching the discoidal spot.

ab. berioi Dufrane. Bull. Soc. Ent. Belg. 1947. 83. p. 73.

Female. On the forewings the black discoidal spot is surmounted by another little black spot. The hindwings also have three little black points, characteristic of ab. punctifera Braun.

ab. passa Verity. Verity. Rhop. Pal. 1909. p. 269. pl. 47. f. 10.
Male with the marginal border pale reddish-brown.

ab. brunnea Tutt. Brit. Butts. 1896. p. 259.
The marginal bands brown.

ab. atrofasciata Rocci. Atti. Soc. Ligust. Sc. Nat. 1920. 30. p. 25. (fig. Lamb. 33. pl. 3. f. 8.
= enervata Kitt. Z. Ost. Ent. Ver. 1924. 9. p. 17.
= nigrofasciata ♂ Manon. Proc. Verb. Soc. Linn. Bord. 1925. 77. p. 147.
= diloui ♂ Manon. Proc. Verb. Soc. Linn. Bord. 1927. . p. 27.
Male form with no yellow veins showing in the black marginal bands.

ab. faillae Stefandli. Bull. Soc. Ent. It. 1900. 32. p. 178.
Male form with the veins in the marginal bands of all wings strongly yellow.

ab. velata Ragusa Nat. Sic. 1904. 17. p. 42.
Male with the marginal bands covered with filmy green scaling.

ab. subviridis Manon. Proc. Verb. Soc. Linn. Bord. 1927. 79. p. 27.
Male with the marginal bands greenish and the ground colour citron-yellow.

ab. cinerascens Row. - Brown. Entom. 1921. 54. p. 156.
"A form of the male in which the black markings tend to albinism and are very pale grey. It equals no. 3 of the aberrations cited by Oberthur in Lep. Comp. 3. p. 173, figured by Verity in Rhop. Pal. pl. 47. f. 10. etc.
This is very confusing, the figure by Verity was named ab. passa and Verity rightly described it as having the bands pale reddish-brown. Rowland Brown now names the same figure cinerascens possibly because it has patches of pale greyish-brown, hence his description of tending towards albinism. Actually it is merely a pathological example.
If cinerascens is used at all it is for specimens with small areas of pallid or misty coloration which do not deserve a name at all.

ab. schirberi Oberthur. Lep. Comp. 1923. 21. p. 171. pl. DLXXI. f. 4918.
The true albino and not to be confused with Rowland Brown's description of the preceding in which he says the markings are very pale grey. The figure by Oberthur shows the marginal band and discoidal spot very pale silvery grey, absolutely uniform and clear. The artist however has shown some black scaling at the base of each wing which an albino should not possess, it is possibly meant as shading.

ab. maculata Lampke. Lamb. 1933. 33. p. 80.
Male. The marginal band showing some spots, as in the female.

ab. tenuimarginata Lampke. Lamb. 1933. 33. p. 86.
Male with the marginal border only half the normal width.

ab. dentata Caruel. Rev. Fr. Lep. 1955. 15. p. 31.
The black marginal band of the hindwings shows on its inner side in the interneura spaces, teeth which are directed towards the base, resulting from a deep infiltration of the yellow veins into the band.

ab.pseudomas Cockerell. Entom.1889.22.p.26.

= obsoleta Tutt. Brit. Butts.1896.p.259.

= pavoli Aigner. Rov.Lapok.1901.7.p.30.

Female. The spots in the marginal band absent, or almost so, on both wings.

ab.subobsoleta Rocci. Atti. Soc. Ligust.1920. .n.25.(fig.Lamb.33.pl.4.f.10)

= nigrofasciata ♀ Manon. Proc. Verb. Soc. Linn. Bord.1925.77.p.147.(nom. preoc. Verity)

= diloui ♀ Manon. Proc. Verb. Soc. Linn. Bord.1927.79.p.27.

= obsoleta Gruber. Ent. Z.1929.43.p.21. Gruber pl.f.10. (nom. preoc. Tutt 1896.)

Female. Some spots in the marginal bands which are less prominent than usual. Transitional to the preceding.

ab.electra Lowin. Ins. Grt. Brit.1795.pl.32.f.2.

= nigrofasciata Maurer. Jahresb. Wien. Ent. Ver.1909.p.31.(nom. preoc. Verity 1908)

= semiobsoleta Rocci Atti. Soc. Ligust. Sc. Nat.1920.30.p.25.

= posteropseudomas Kraut. Ent. Z.1929.43.p.84. (fig.Lamb.30.pl.2.f.2.)

Female. The spots in the margin of the hindwings absent.

ab.decurtata Kitt. Z. Ost. Ent. Ver.1924.9.p.16.

Female. The marginal band of the forewings abbreviated and very little black marking on the hindwings, thus the pale markings are more extensive.

ab.earinica Oberthur. Lep. Comp.1909.3.p.175.

Female. The black border of the forewings powdered with yellow at the apex. Oberthur does not state the colour of the veins which in the next form are outlined prominently in yellow.

ab.hyerensis Strand. Soc. Ent.1918.33.p.27.(from fig. in Rhop. Pal. pl.45.f.55)

Named from the figure in Verity's Rhop. Pal. which shows a striking insect with three distinct characters. The apex of the forewings is suffused with yellow on the black marginal band and the veins are outlined in yellow. On the hindwings the black border is almost completely replaced by yellow, only a small portion of black remaining near the apex on the inner side of the yellow spots. The result is an insect much more yellow in the marginal areas than the normal female.

ab.derennei Braun. Lamb.1930.30.p.10.pl.2.f.4.

The figure shows a female with the veins in the black border of the forewings outlined in yellow especially towards the apex. Sometimes the discoidal spot is very large. The hindwings normal.

Some authors make this the same as the preceding hyerensis but since the hindwings are normal this cannot be so.

ab.turbida Braun. Lamb.1935.35.p.115.

Female. The yellow spots in the black margin of the forewings are uncertain in their shape and pattern.

The figure shows the spots irregular in shape and position but exactly the same on both wings.

ab.crassesignata Kitt. Z. Ost. Ent. Ver.1924.9.p.16.

Female. The spots in the black marginal band of the forewings pale and large, standing out prominently, the discoidal spot also large.

ab. *divisa* Rocci. Atti. Soc. Ligust. Sc. Nat. 1920. 30. p. 25.

= *marginata* Braun. Anat. Pap. 1923. 1. p. 178. fig.

Female. The yellow spots in the black marginal band of the forewings joined together into a continuous band, dividing the black border almost into two parts.

ab. *completa* Lempke. Lamb. 1933. 33. p. 83.

Female. On both fore and hindwings the black marginal border is divided by a continuous chain of united yellow spots. The inner black band of the hindwings is as wide as the outer one, the pattern thus matches the forewings.

ab. *fulvosignata* Rocci. Atti. Soc. Ligust. Sc. Nat. 1920. 30. p. 24.

= *saturator* Kitt. Z. Ost. Ent. Ver. 1924. 9. p. 16.

Female. The spots in the black marginal band of the forewings are fulvous to orange, not paler than the ground colour.

ab. *megei* E.-B. Proc. Verb. Soc. Linn. Bord. 1925. 77. p. 22. (Ecole Bordelaise)

Female. The spots in the black margin of the forewings pale yellow or even white but the ground colour normal orange.

It is doubtful if this name can stand since it has no definite author beyond the school, or society, Ecole Bordelaise.

ab. *radiata* Nitsche. (nom. preoc. Manon) Z. Ost. Ent. Ver. 1932. 17. p. 85.

Female. The yellow spots in the black marginal band of the hindwings drawn out into streaks to the margin.

ab. *internodimidiata* Rocci. Atti. Soc. Ligust. Sc. Nat. 1920. 30. p. 25.

Female. On the hindwings the yellow spots in the border are so enlarged as to obliterate the inner part of the black band.

ab. *punctifera* Braun. Anat. Pap. 1923. 1. p. 178. fig.

Female. On the hindwings there are three black spots on the inner side of the yellow spots in the margin. Occurs in both *croceus* and *helice* types.

These presumably are all that remains of the inner black marginal band.

ab. *rubroandroconiata* Obraztsov. Z. Ost. Ent. Ver. 1936. 21. p. 46.

Male. The androconial spot on the costa of the hindwings is red instead of yellow.

ab. *parvipuncta* Lempke. Tijdschr. Ent. 1954. 97. p. 313.

On the upperside of the forewings the discoidal spot is distinctly reduced in size, for the rest normal.

ab. *magnipuncta* Lempke. Lamb. 1933. 33. p. 86.

On the upperside of the forewings the discoidal spot is very large.

ab. *punctellata* Braun. Lamb. 1930. 30. p. 9.

The discoidal spot very small, tending to disappear because it is in part covered with orange scales.

ab. regressa Verity. Farf. Diurn. It. 1947. 3. p. 281. pl. 35. f. 50.

On the upperside the discoidal spot is orange, not black, and therefore like that of the hindwings but smaller. On the underside it is of the normal black.

ab. pupillata Reverdin. Bull. Soc. Lep. Gen. 1906. 1. p. 170. pl. 6. f. 2. as albidopupillata

= albidopupillata Reverdin. Bull. Soc. Lep. Gen. 1906. 1. pl. 6. f. 2. (erroneous)

= xanthostigma Stauder. Soc. Ent. 1925. 40. p. 6.

= circumiens Bollow. Seitz. Macrolep. Suppl. 1930. 1. p. 118.

On the forewings the discoidal spot is pupilled with orange on both upper and underside.

Reverdin described his form as "pupillata" in the text and "albidopupillata" on his plate.

Bollow described his circumiens as having the discoidal spot replaced by a ring which is the same as having it pupilled with orange.

ab. cincta Le Charles. Amat. Pap. 1926. 3. p. 120. pl. 8. f. 9.

On the upperside of the hindwings the discoidal spot is surrounded by black.

ab. bimaculata Rocci. Atti. Soc. Ligust. Sc. Nat. 1920. 30. p. 26. (fig. Lamb. 33. pl. 4. f. 15)

On the hindwings the discoidal spot is separated into two distinct spots on both upper and underside.

ab. bipupillata Pionneau. Echange. 928. no. 431. p. 3.

On the hindwings the discoidal spot is separated into two distinct spots on the upperside only. On the underside it is normal.

ab. helena Herrich-Schaffer. Eur. Schmett. (Syst. Bearb.) 1844. 1. pl. 45. f. 206-7.
(descript. vol. 6. p. 22.)

The figure shows a male with the marginal band of the hindwings very much narrowed and with a row of pale orange spots replacing the part of the band which is missing i.e. - the inner side, and this can be traced by feeble outlining of the interneural oval spots which are of paler orange than the rest of the wing.

Treated by some authors as a synonym of the type form but, by the figure, a most unusual aberration.

ab. posticominita Verity. Farf. Diurn. It. 1947. 3. p. 285. pl. 36. f. 15.

The hindwings diminished in size because the external margin is straighter than normal and the tornus has a more acute angle.

ab. angustior Cockerell. Entom. 1889. 22. p. 148. (fig. Entom. 11. p. 52.)

The wings narrower and longer in proportion than usual.

ab. major Cockerell. Entom. 1889. 22. p. 176.

= major Le Charles. Amat. Pap. 1926. 3. p. 120. fig.

= gigantea Braun. Lamb. 1930. 30. p. 7.

Very Large. Over 57 mm.

ab. minor Failla. Nat. Sic. 1887. 7. p. 52.

= minor Cockerell. Entom. 1889. 22. p. 176.

= pyrenaica Grun Grshimailo. Hor. Soc. Ent. Ross. 1893. 27. p. 383.

Dwarf forms, under 57 mm.

ab. *grisandroconiata* Lempke. Tijdschr. Ent. 1954. 97. p. 311.
On the hindwings the androconial spot at the base is grey.

ab. *aegra* Verity. Rhop. Pal. 1909. p. 270.
On the upper and underside some blackish marks or spots.
These may or may not be stains. In any case the form would seem to be pathological and not worthy of a name.

ab. *duplex* Cockerell. Entom. 1889. 22. p. 176.
The forewings both of "helice" colouring but the hindwings of normal orange croceus.
Also specimens with the left wings croceus orange colouring and the right wings helice colour.
These two specimens are in the Rothschild-Cockayne-Kettlewell Collection but the name cannot stand as both are fakes, beautifully executed and stuck together so that the joints cannot be seen, but fall apart when relaxed in moisture.

ab. *helicoides* Sagarra. Trab. Mus. Barcelona 1914. 2. p. 10. pl. 4. f. 4.
The forewings of "helice" colour but the hindwings of normal orange croceus.
Presumably a genuine somatic mosaic.

ab. *unimaculata* Pionneau. Misc. Ent. 1925. 28. p. 57. (nom. preoc. Kitt 1924)
On the upperside of the hindwings the discoidal spot is single, the small one usually above it is absent.
Pionneau does not actually mention upperside or underside but says the form is the same as *C. hyale* ab. *unimaculata* Tutt and *C. phicomene* ab. *unimaculata* Pionn., both of which were upperside forms. The form when on the underside is named ab. *niedeicki* Strand. See underside forms.

ab. *reisseri* Agenjo. Z. Wien. Ent. Ges. 1941. 26. p. 84. pl. 8. f. 2.
Melanic. The whole upperside of all wings unicolorous blackish-brown without perceptible markings except an indistinct discal spot and yellowish-green hairs at the base of the forewings.

9. croceus Foure. continued.
(underside forms)

ab. niediecki Strand. Int. Ent. Z. 1909. 3. p. 78. (fig. Lamb. 33. pl. 4. f. 16.)
= unimaculata Kitt. Z. Ost. Ent. Ver. 1924. 9. p. 16.

On the underside the discoidal spot of the hindwings is a single ocellus, the small one usually above it being absent or only in the form of a small point without a silver pupil.

ab. geisleri Bryk. Ent. Tidskr. 1923. 44. p. 109. (fig. Lamb. 33. pl. 4. f. 13)
= lacrimans Stauder. Soc. Ent. 1925. 49. p. 6.

On the hindwings underside the discoidal spot is large and drawn out into points towards the outer margin.

ab. plurimaculata Mezger. Lamb. 1932. 32. p. 232.

On the underside of the hindwings the Mother-of-Pearl (discoidal) spot is surrounded by five other spots, two of which have pearly centres, the three others mere brown dots. The five are all contained in the brown ring which normally surrounds the main spot.

ab. deannulata Rocci. Atti. Soc. Ligust. Sc. Nat. 1920. 30. p. 46.

On the underside of the hindwings the outer line or shade, which encloses the silver of the discoidal spot, is absent.

ab. rufomaculata Lempke. Ent. Ber. (Amst.) 1932. 8. p. 394.

On the underside of the hindwings the discoidal spot is dusted over the silver with carmine-red. Transitional specimens are tinted lighter red.

ab. roseosatura Verity. Farf. Diurn. It. 1947. 3. p. 283. pl. 35. f. 47.

The underside very gay owing to the richness and rosy-wine colouring, not only of the head and thorax and contours of the wings, but also the submarginal spots of the hindwings which normally are rust-coloured.

ab. seriata Rocci. Atti. Soc. Ligust. Sc. Nat. 1920. 30. p. 25. (fig. Lamb. 33. pl. 4. f. 17.)

On the underside of the hindwings a complete series of marginal spots, strongly represented.

ab. subtuscuneata Galvagni. Verh. zool.-bot. Ges. Wien. 1929. 79. p. (38). fig. 5.

On the underside of the hindwings the antemarginal spots are large and wedge-shaped, their points towards the base and merging into the discoidal cel..

ab. semidemarginata Pionneau. Echange 1929. no. 435. p. 3. (fig. Lamb. 33. pl. 4. f. 18.)

On the underside of the hindwings there is no sign of the antemarginal spots. The form is figured in Lamb. 33. pl. 4. f. 18 as demarginata in error.

ab. infralutea Verity. Farf. Diurn. It. 1947. 3. p. 280. pl. 36. f. 41.

The underside pure yellow, more or less rich.

ab. infraviridis Verity. Farf. Diurn. It. 1947. 3. p. 280.

the underside of a decided green with a trace of blue, more frequent in females.

ab. *infracaerulescens* Verity. Parf. Diurn. It. 1947. 3. p. 280. pl. 36. f. 35.
The underside of a cold bluish-grey, an extreme form of *infraviridis* Wt. and
transitional to *caerulea* Verity.

ab. *fischeri* Braun. Lamb. 1928. 28. p. 117. (fig. Lamb. 33. pl. 4. f. 14.)
On the underside of the forewings the discoidal spot is ocellated or pupillet.

ab. *magnumaculata* Lempke. Tijdschr. Ent. 1954. 97. p. 314.
On the underside of the hindwings the two silver spots coalesce into one large spot.

(helice forms.)

- ♀ ab. helice Hubner. Samml. Eur. Schmett. 1779. pl. 87. figs. 440-441. (original fig. in B.M.)
 = pallida Tutt. Brit. Butts. 1896. p. 259.
 = subhelicina Manon. Proc. Verb. Soc. Linn. Bord. 1926. 77. p. 148.
 = subflavescens Pionneau. Misc. Ent. 1930. 32. p. 10.
 The ground colour creamy instead of orange.
 The original figure of helice has been inspected and it shows the wings not white, or yellow, but creamy. This is the only term to safely use. We have two different copies of Hubner's work in the Tring Museum and one is completely different from the other. In the oldest, the colour of helice is more or less correct although the left wings have become discoloured with age, the white becoming leaden, the other wings are creamy. In the second copy the wings are distinctly tinted yellow. This is probably the copy which Tutt saw and named his pallida under the impression that true helice was pale yellow. His pallida had the ground colour white or creamy-white.
- ♀ ab. helicina Oberthur. Bull. Soc. Ent. Fr. 1880. p. 145.
 = xanthina Berger. Lamb. 1936. 36. p. 200.
 The ground colour pale yellow with a bright saffron or rosy glaze.
- ♀ ab. alba Lempke. Lamb. 1933. 33. p. 39.
 = leucos Berger. Lamb. 1936. 36. p. 200.
 The ground colour pure or dead white.
- ♀ ab. aubuissoni Caradja. Iris 1893. 6. p. 171.
 = flavida Ksienchopolsky. Trav. Soc. Rech. Volhynie 1911. 8. p. 29.
 = auriflua Berger. Lamb. 1936. 36. p. 200.
 The ground colour yellowish-orange, intermediate between the type and helice. The hind wings dark dusted, with a large orange discoidal.
- ♀ ab. albissima Ragusa. Elenco dei Lep. Sic. 1916. p. 20.
 = oberthuri Braun. Anat. Pap. 1923. 1. p. 177.
 = sommambula Bryk. Ent. Tidskr. 1923. 44. p. 109.
 = pallida Stauder. (nom. preoc. Tutt.) Z. Wiss. Ins. Biol. 1920. 16. p. 222.
 helice form with the discoidal spot on the upperside of the hindwings white instead of orange.
- ab. flavomaculata Braun. Lamb. 1928. 28. p. 117.
 = pallida Gruber. Ent. Z. 1929. 43. p. 21. (nom. preoc. Tutt.)
 helice form with the discoidal spot of the upperside of the hindwings light yellow instead of orange.
- ab. zuellichi Nitsche. Z. Ost. Ent. Ver. 1932. 17. p. 85.
 On the underside of the forewings the discoidal spot is completely absent. On the upperside it is represented by a small spot ending in split orange marks.
 The form was described from a specimen of helice but may well occur among the type form.
- ab. berthina Braun. Lamb. 1930. 30. p. 11. pl. 2. f. 9.
 On the upperside the marginal spots are of a clear greenish tint, contrasting with the whitish colour of the rest of the wings.

ab. nigra Aigner. Ann. Mus. Nat. Hung. 1906. 4. p. 448.

= adoratrix Stauder. Boll. Soc. Adriat. 1912. p. 149.

helice form with the light spots normally seen in the black marginal band absent or almost so as in ab. pseudomas Cockerell of the typical form.

ab. myrmidonides Stauder. Z. Wiss. Ins. Biol. 1916. 12. p. 59. (fig. vol. 11. pl. 5. f. 7.)

= semidivisa Rocci. Atti. Soc. Ligust. Sc. Nat. 1920. 30. p. 25.

= myrmidoneformis Gruber. Ent. Z. 1929. 43. p. 21. Gruber plate. fig. 7.

= marginata Braun. Lamb. 1930. 30. p. 6.

helice form showing in the marginal band of the forewings eight well-marked yellow spots which form a continuous light band, dividing the black band into two. The spots in the hindwings margin also form a yellow band as in C. myrmidone.

ab. pullata Heinrich. Ent. Z. 1930. 43. p. 295.

helice form with the light spots in the margin of the hindwings absent.

ab. seriata Pionneau. Echange 1932. 47. p. 16. (nom. preoc. Rocci.)

helice form showing on the underside a complete row of automarginal spots on the hindwings.

Rocci described this form by the same name when occurring in the type form croceus.

ab. caerulea Verity. Entom. 1904. 37. p. 54.

= caerulea Dragoni-Rabenhorst. Ent. Z. 1912. 26. p. 115.

helice form with the underside of a most lovely pale sky-blue, replacing the green parts.. Upperside of the whitish helice form.

ab. ridicula Alpheraky. Hor. Soc. Ent. Ross. 1908.

= minor Pionneau. (nom. preoc. Failla) Misc. Ent. 1930. 32. no. 6. p. 10.

Dwarf. Very small specimens of helice.

See ab. minor Failla for small specimens of the typical form. It seems quite unnecessary to name such specimens again in the helice form.

INDEX

| | | | |
|--------------------------------------|------|-----------------------------------|----|
| alba Lpke. | 1. | minor Lamb. | 1. |
| albescens Vty. | 3. | | |
| aurantiaca Lpke. | 1. | | |
| aureus Froh. | 3. | nana Wnuk. | |
| | | nigrescens Hechl. | 1. |
| | | nigriapicata Reuss. | 1. |
| bivoltina van Mell. <i>no descr.</i> | | | |
| britannica Oberth. | 1. | | |
| | | obsoleta Lamb. | 2. |
| | | ochracea Vty. | 3. |
| carnea Car. <i>no descr.</i> | | | |
| cleodoxa R  b. | 1. | | |
| | | pallida Hannem. | 1. |
| | | parvipuncta Tutt. | 1. |
| decora Oberth. | 2. | progressiva Geest. | 2. |
| dentata Car. <i>no descr.</i> | | | |
| | | rhamnoides Der. | 1. |
| erubescens Hag. | 3. | rosea Linst. | 2. |
| | | roseodecora Car. <i>no descr.</i> | |
| | | roseotincta Debche. | 2. |
| fervida Fritsch. | 3. | rubescens Gillm. | 2. |
| filia R  b. | 2. | | |
| flavescens Lpke. | 1. | | |
| | | variegata Lamb. | 2. |
| | | viridissima Vty. | 3. |
| gerardi Der. | 3. | | |
| gravesi Hugg. | 3. | | |
| grimardi Dufr. | 2-3. | | |
| | | | |
| hoefnageli Bryk. | 3. | | |
| | | | |
| infradestrigata Lpke. | 3. | | |
| intermedia Tutt. | 1. | | |
| inversa Hannem. | 1. | | |

rhammi Linnaeus. Syst. Nat. 1758. K. p. 470.

aberrational forms etc.

ab.aurantiaca Lempke. Lamb. 1932. 32. p. 29.

Male. Of a magnificent golden yellow, the underside less bright.

ab.pallida Hannemann. Int. Ent. 4. 1916. 9. p. 113.

Male. The colouring pale like that of the female.

ab.alba Lempke. Lamb. 1932. 32. p. 38.

Female. Pure white.

ab.flavescens Lempke. Tijdschr. Ent. 1936. 79. p. 256.

Female. Light yellow without the greenish shade, the margins slightly darker yellow.

ab.intermedia Tutt. Brit. Butts. 1896. p. 264.

Female. The forewings on the upperside greenish-yellow, the margins particularly tinted.

ab.britannica Oberthur. Lep. Comp. 1909. 3. p. 177.

= inversa Hannemann. Int. Ent. 4. 1916. 9. p. 113.

Female with colouring like that of the male.

ab.nigrescens Hechler. Ent. 1. 1923. 37. p. 40.

Blackish olive-green, the veins yellow and the margins yellow. The four discoidal spots large and almost black. Underside greyish-brown.

ab.nigriapicata Reuss. Entom. 1910. 43. p. 209.

Forewings with a black tip or apex.

ab.cleodoxa Rober. Seitz Macrolep. 1907. 1. p. 61. (see Tutt's Brit. Butts. 1896. p. 264)
= parvipuncta Tutt. Ent. Rec. 1910. 22. p. 181.

The orange middle spot of the forewings very small or obsolete or merged into the ground colour. This is taken to mean that a vestige of the spot remains.

Tutt's parvipuncta had very minute orange central spots.

Rober created the name "cleodoxa" through misreading Tutt's description of the discoidal spots variation in Brit. Butts. p. 264. He credits Tutt with the authorship quite wrongly, Tutt merely said - "Occasionally this is so small as to be almost obsolete, at other times it originates an orange flush suggestive of its lovely neighbour G. cleodoxa".

See next page for ab.obsoleta Lamb. in which the discoidals are completely absent.

ab.minor Lambillon. Rev. Mens. Soc. Ent. Nam. 1913. 13. p. 13.

= rhamnoides Derenne. Rev. Mens. Soc. Ent. Nam. 1919. 19. p. 51.

Small specimens. Derenne's rhamnoides was two thirds normal size.

ab. *obsoleta* Lambillion. Rev. Mens. Soc. Ent. Nam. 1913. 13. p. 14.

On the upperside of the forewings the orange point is completely absent. Rober described his *cleodoxa* as having the discoidal very small, or obsolete, or merged into the ground colour, two forms under the one name. Lambillion has rightly separated the much rarer form, without any trace of the spot, as *obsoleta*.

The following forms all show an area of orange, orange-red or red-brown on the wings and are placed in order of priority.

ab. *progressiva* Geest. Allg. Z. f. Ent. 1902. 7. p. 529.

Forewings with an extensive orange flush similar in appearance to *G. cleopatra* but with a narrower border of normal yellow, uniform in width from costa to inner margin. Hindwings normal.

ab. *rubescens* Gillmer. Int. Ent. Z. 1907. (June). 1. p. 66.

Gillmer in a somewhat puzzling article first describes a specimen which had the forewings purple-red. He then goes on to describe forms which have either the costal border 1 mm. wide reddish-brown, or the whole margin of fore and hindwings to a width of 3 mm. surrounded or enclosed with reddish-brown. In a later article he says that his *rubescens* is the same as *ab. rosea* Linstow and has priority over it. From this it would appear that Gillmer is giving his name *rubescens* to all specimens which show orange or red-brown areas on the wings and gives a list of such examples, some taken in England with varying patterns, placing them all under the name *rubescens*, separating them only from the preceding *progressiva* because the latter has orange on the forewings only, whilst his own form has it on both fore and hind wings.

In view of all these contradictions *rubescens* would seem to be an undetermined form unless one wishes to include all the following individual forms under the one name and make the rest synonyms which is somewhat drastic.

ab. *rosea* Linstow. Ent. Z. 1907 (July). 21. p. 96.

The forewings dusted dull rose except for a narrow border on the outer margins. The hindwings show the same colour in the disc.

ab. *filia* Rober. Seitz Macrolep. 1907. 1. p. 61. (fig. Iris 18. pl. 1. f. 12.)

The wings showing a red submarginal band.

The figure in Iris shows this band very thin and washed out, just preceding the margins.

ab. *decora* Oberthur. Lep. Comp. 1909. 3. p. 177. (fig. vol. 6. pl. CXVI. f. 1114.)

The figure shows the forewings with a large orange area leaving only normal yellow as a border on the costa and outer margin. Hindwings with orange in the centre leaving a yellow marginal border which is broader than that on the forewings. This would seem to be extremely similar to *ab. rosea* Linstow, it is separated only because Linstow terms his colour "dull rose".

ab. *variegata* Lambillion. Rev. mens. Soc. Ent. Nam. 1919. 19. p. 50.

Large blotches of orange on all wings, especially the forewings, and more or less regular in pattern. It recalls its southern neighbour *G. cleopatra*.

ab. *roseotincta* Debauche. Lamb. 1928. 28. p. 58.

Pale rose or orange in the cell of the forewings and in the interneural spaces 2, 3, 4 and 5. The nervures of normal yellow.

ab. *grimardi* Dufrane. Bull. Soc. Ent. Belg. 1947. 83. p. 61.

Upperside of the forewings with a large area of reddish-brown limited by a border almost straight from the basal side which begins about 2 mm. from the origin of vein 6, a little above it, then between 6 and 7, going on directly as far as the middle of vein 2, even passing this slightly, then going along 2 as far as 3 mm. from its

ab. grimardi Dufrane. continued from previous page.
 extremity, from there forming a regular arc, convex towards the exterior as far as 3 then going straight as far as 4 mm. from the extremity of 5 which it follows for 1 mm. in returning towards the base and from there going to join directly vein 6 by a toothed line, rejoining its point of departure along 6 but going a little above it. This area through its transparency allows one to see through to the underside.

Making a sketch from the positions given of the veins etc., shows that there is a reddish-brown area, roughly square, in the centre of the forewings leaving a broad yellow border all round it. The area starts a little beyond the end of the discoidal cell.

ab. aureus Frohawk. Vars. Brit. Butts. 1938. p. 184. pl. 45. f. 3.

This is not an aberration of *G. rhamni* but a typical specimen of *G. cleopatra*. It is in the R.C.K. Collection here at Tring.

ab. gerardi Derenno. Rev. Mens. Soc. Ent. Nam. 1923. 23. p. 37.

This would appear to be an artefact created by chemical action. I have manufactured such specimens by keeping them in wet cyanide.

The yellow of the upperside has here and there turned to red. There is a reddish band with irregular outline along the costal border of the forewings, the fringe largely red on all wings, a little splash of bright red at the angle of the left hindwing. On the underside of the hindwing is an extended mark, reddish, but much less apparent, from the external border.

rhamni

subsp. gravesi Huggins. Entom. 1956. 89. p. 65.

The subspecies inhabiting Ireland. For details see description.

ab. viridissima Verity. Ent. Rec. 1919. 31. p. 48.

The underside vivid green.

ab. albescens Verity. Ent. Rec. 1919. 31. p. 48.

The underside pale greenish or white.

ab. fervida Fritsch. Int. Ent. 4. 1911. 5. p. 200.

= ochracea Verity. Ent. Rec. 1919. 31. p. 48.

= erubescens Hagen. Z. Wiss. Ins. Biol. 1920. 15. p. 190.

The underside of a brownish tint, the upperside richer than usual.

Verity's ochracea had the underside fine reddish-ochre.

Hagen's erubescens had the underside reddish-yellow, the upperside richer yellow in the male and white with a reddish tone in the female.

These three forms are too close to make them separate, brownish and reddish-yellow are the two ends of the tint in this form.

ab. hoefnageli Bryk. Ent. Tidskr. 1922. 43. p. 173. fig.

The underside of the hindwings showing seven antemarginal brownish spots.

ab. infradestrigata Lampke. Tijdschr. Ent. 1954. 97. p. 317.

On the underside of fore and hindwings the short dark postdiscal striae fail completely.

rhanni Linnaeus. continued,
as *rhanni* Linnaeus. continued,
as *rhanni* Linnaeus. continued,
as *rhanni* Linnaeus. continued,

INDEX

| | | | | | |
|----------------------------|----|---------------------|-----|--------------------------|-----|
| adaperta Der. | 7. | delunulata Stätt. | 5. | immaculatus Schultz. | 5. |
| alberici Dufr. | 3. | demaculata Schultz. | 6. | immaculatus Vty. | 5. |
| analidilatata Obrazts. | 8. | demaculata Stätt. | 5. | incompletus Masl. | 5. |
| angulata Vty. | 9. | diaphorus Cab. | 5. | inornatus Frings. | 2. |
| apertalunulata Lpke. | 5. | diffusa Rocci. | 8. | intacta Shelj. | 8. |
| atrofasciata Rocci. | 2. | dilobatus Cab. | 7. | | |
| atromarginata Stndfss. red | 1. | dissoluta Schultz. | 7. | | |
| aurantiaca Selys. | 1. | drusus Fuchs. | 10. | karckzewskia Wize. | 6. |
| aurantiaca Spey. | 1. | | | | |
| aurantior Krul. | 1. | | | | |
| | | elunata Speng. | 4. | latelutea Goods. | 7. |
| | | eminens Schultz. | 2. | latevittata Vty. | 3. |
| bella Stätt. | 8. | erardi Man. | 2. | legrosi Dufr. | 4. |
| benesignata Krul. | 8. | estrigata Maxis. | 7. | lunatica Bryk. | 4. |
| benevittatus Cab. | 5. | estrigata Nitsche. | 7. | lunulacarens Lpke. | 5. |
| biadaperta Mezg. | 7. | evittata Speng. | 7. | | |
| bigenerata Vty. | 1. | exocellatus Cab. | 9. | | |
| bimaculatus Eim. | 5. | | | marginalis Robbe. | 4. |
| bipunctata Seltz. | 5. | | | melanosticta Rev. | 5. |
| brevis Mezg. | 4. | fenestrella Cuno. | 7. | minor Bois-Reym. | 10. |
| britannicus Seltz. | 1. | ferenigra v. Rosen. | 6. | minor Lhomme. | 10. |
| brunnea Weiss. | | "fere nigra" Speng. | 6. | minor Pionn. | 10. |
| burdigalensis Trim. | 1. | flammata Blach. | 8. | | |
| | | flammea E.B. | 8. | | |
| | | flava Tutt. | 1. | nebeskyi Alb. | 5. |
| caeca Closs. | 9. | flavofasciata Lpke. | 3. | nervosa Dufr. | 10. |
| castinii Lamb. | 8. | flavus Jord. | 1. | niger Heyne. | 1. |
| cellacircinata Mezg. | 6. | fontainei Dufr. | 4. | niger Reuttl. (in litt.) | 1. |
| cellularis Oberth. | 8. | furcata Dufr. | 9. | niger-rubripunctus Guth. | 2. |
| circinnatus Sib. | 9. | | | nigra Speng. | 1. |
| clara Rocci. | 7. | | | nigrociliata Stätt. | 2. |
| clavatus Cab. | 3. | gorganus Frühst. | 1. | nigrofasciata Rothke. | 3. |
| comma Stätt. | 8. | gynaecotropa Bryk. | 9. | noviesignata Uffeln. | 4. |
| concaufasciatus Cuno. | 4. | | | | |
| conclusa Uffeln. | 8. | | | | |
| confluens Schultz. | 6. | hiemalis Fett. | 2. | obscura Froh. | 1. |
| conjuncta Rocci. | 3. | | | occlusa Lpke. | 10. |
| convexifasciatus Cuno. | 4. | | | oudemansi Strand. | 4. |
| coronis Reuss. | 2. | | | | |
| cyanatus Stätt. | 7. | | | | |

INDEX (cont'd.)

| | | | |
|-------------------------------|-----|------------------------------|-----|
| <i>pallida</i> Tutt. | 2. | <i>watzkai</i> Garb. | 10. |
| <i>paradoxa</i> Frings. | 3. | | |
| <i>pierardi</i> Dufr. | 9. | | |
| <i>postevittata</i> Ekw. | 7. | <i>xanthophthalma</i> Staud. | 9. |
| <i>punctatoclavatus</i> Cab. | 5. | | |
| <i>punctellatus</i> Cab. | 5. | | |
| <i>pupillata</i> Car. | 6. | <i>zancleus</i> Gel. | 10. |
| | | <i>zancleusoides</i> Rag. | 10. |
| <i>quinquemaculatus</i> Bezs. | | | |
| <i>rubroanalis</i> Stätt. | 9. | | |
| <i>rubromaculata</i> Schultz. | 8. | | |
| <i>rubromaculatus</i> Aign. | 8. | | |
| <i>rufa</i> Pionn. | 10. | | |
| <i>rufopunctata</i> Wheel. | 8. | | |
| <i>sciata</i> Wize. | 2. | | |
| <i>seminigra</i> Oberth. | 6. | | |
| <i>spengeli</i> Reiff. | 4. | | |
| <i>sphyroides</i> Krul. | 3. | | |
| <i>spuleri</i> Fisch. | 3. | | |
| <i>standfussi</i> Fuchs. | 10. | | |
| <i>subintacta</i> Obratzs. | 9. | | |
| <i>subsphyroides</i> Dufr. | 3. | | |
| <i>suffusa</i> Speng. | 2. | | |
| <i>symmelanus</i> Lamb. | 6. | | |
| <i>tenuimarginata</i> Stätt. | 3. | | |
| <i>tenuivittata</i> Speng. | 3. | | |
| <i>tritis</i> Lamb. | 9. | | |
| <i>tristis</i> Stätt. | 2. | | |

machaon Linnaeus. Syst. Nat. 1758. X. p. 462.

Aberrational forms etc.

machaon

subsp. britannicus Seitz. Seitz Macrolep. 1907. 1. p. 12. pl. 6. row 2.

= flavus Jordan. (prim. homonym *P. flava* Brunnich.) Nov. Zool. 1896. 3. p. 462.

Our English subspecies from Wicken Fen and the Norfolk Broads with wider marginal bands etc.

Jordan raised the name flavus for the English race as it was the first to be used for English specimens (ab. flava Tutt) but the name is invalid as such since it is a secondary homonym of *Papilio flava* Brunnich (Hesperiidae) Tutt's flava described as an aberration can therefore stand as infra-subspecific.

machaon

subsp. bigenerata Verity. Ent. Rec. 1919. 31. p. 88.

= gorganus Fruhstorfer. Ent. Rundsch. 1922. 39. p. 13.

The subspecies from Central Europe which migrates occasionally from the Continent to the south-eastern counties of England-Kent, I. of Wight etc.

Verity described the race from Central Europe under the name bigenerata and Fruhstorfer under the name gorganus the race from Germany, Austria and Central Europe. Since there is no other race in this area of the Continent the two are the same, bigenerata having priority. See note by Warren in Entom. 82. p. 150.

ab. flava Tutt. Brit. Butts. 1896. p. 218.

The ground colour pale primrose.

ab. burdigalensis Trimoulet. Actes. Soc. Linn. Bordeaux. 1858 (1. IV.) 22. p. 10.

= aurantiaca Speyer. Geogr. Verbr. Schmett. 1758. 1. p. 278.

= aurantiaca Selys. Ann. Soc. Ent. Fr. 1831. p. 4. (nom. nud.)

The ground colour dark yellow or orange yellow.

Most specimens of this colour are not genuine but the result of chemical action or exposure to light. The true form however does exist among bred specimens.

ab. aurantior Krulikowsky. Bull. Soc. Nat. Mosc. 1890. pl. 8. f. H.

The ground colour even deeper orange than the preceding burdigalensis Trin.

ab. brunnea Weiss

Trab. Inst. Nat. Barcelona. 1915. p. 3.

ab. obscura Frohawk. Vars. Brit. Butts. 1938. pl. 46. f. 2.

The ground colour dull brown with a slight tint of yellow, the normal black markings still quite apparent.

ab. niger Heyne. Pal. Gross Schmett. 1895. p. 694.

= niger Reutti. Uebers. Lep. Baden. 1882. (in litt.) p. 16.

= nigra Spengel. Zool. Jahrb. Syst. 1899. 12. p. 375. pl. 17. f. 9.

The wings black, the normal black markings only faintly discernible.

ab. niger-rubripunctus Guth. Int. Ent. Z. 1925. 19. p. 84.

All the wings black as far as the anal "eyes" of the hindwings which have the lower part yellow merging into reddish.

ab. suffusa Spengel. Zool. Jahrb. Syst. 1899. 12. p. 381. pl. 19. f. 14.

A faint black suffusion of the yellow parts, particularly on the underside.

ab. erardi Manon. Proc. Verb. Soc. Linn. Bord. 1926. 78. p. 39.

The ground colour yellowish-grey, somewhat transparent.

ab. pallida Tutt. Brit. Butts. 1896. p. 218.

The ground colour almost white.

ab. hiemalis Fettig. Bull. Soc. Nat. Colmar. (1909-10) 1910. p. 17.

The outer marginal band of the forewings without any yellow dusting.

ab. inornatus Frings. Soc. Ent. 1908. 23. p. 9.

The marginal band of the forewings completely deprived of yellow scales and the band of the hindwings deprived of the blue scales, leaving both marginal bands black.

ab. nigrociliata Stattermayer. Ent. Anz. 1924. 4. p. 134.

The fringes black and all the patterning deep black. The marginal band of the forewings deprived of yellow scales.

ab. atrofasciata Rocci. Atti. Soc. Ligust. Sc. Nat. 1919. 30. p. 14.

On the hindwings there is little blue on the marginal band, of a faded shade and vanishing in certain lights.

ab. tristis Stattermayer. Ent. Anz. 1924. 4. p. 134.

On the hindwings the marginal band is dusted with yellow instead of blue scales, giving a dull appearance.

ab. coronis Reuss. Int. Ent. Z. 1916. 10. p. 46.

The marginal band of the forewings suffused with blue scales instead of the usual yellow. On the hindwings there is some reddish dusting in the centre of the band on top of the blue scaling.

ab. eminens Schultz. Soc. Ent. 1911. 26. p. 33.

On the forewings the marginal band is dusted with brilliant blue. On the hindwings the band is blue, with no black scaling.

ab. sciata Wize. Suppl. Cat. Lep. Jezewo. 1922. p. (1) 260.

The bluish-black bands of the hindwings showing, on their inner side, shady borders which correspond with a broadening of the bands on their external side.

ab. subsphyroides Dufrane. (nom. nov. pro sphyroides Krul.) Bull. Soc. Ent. Belg. 1946. 82. 108
 = sphyroides Krulikowsky. (nom. preoc. Verity). Rev. Russe Ent. 1909. 9. p. 109.
 The black marginal band of the hindwings all but touching the bar which closes the median cell.

ab. clavatus Cabeau. Rev. Mens. Soc. Ent. Nam. 1911. 11. p. 77.
 The black marginal band of the hindwings connecting with the black bar which closes the median cell by a black line, about 2 mm. thick, leaving no yellow interval.

ab. conjuncta Rocci. Bull. Soc. Ligust. 1919. 30. pl. 1. f. 4.
 The black marginal band of the hindwings connecting with the black bar which closes the median cell by two spurs. The black bar is enlarged to form a true spot.

ab. punctatoclavatus Cabeau. Rev. Mens. Soc. Ent. Nam. 1911. 11. p. 77. fig.
 The hindwings with the character of clavatus Cabeau showing the black marginal band connected with the black bar which closes the discoidal cell by a thick black line, and on the forewings the character of bimaculatus Em. which has a black spot in each of the two topmost yellow spaces of the yellow median band.

ab. latevittata Verity. Rhop. Pal. 1911. p. 295. pl. 57. f. 7.
 The black marginal band of both fore and hindwings extremely wide, in the hindwings almost reaching the black bar which closes the discoidal cell. The Type is in the R.C.K. Coll. here at Tring.

ab. tenuivittata Spengel. Zool. Jahrb. Syst. 1899. 12. p. 364. pl. 19. f. 13.
 = tenuimarginata Stattermayer. Ent. Anz. 1924. 4. p. 134.
 The black marginal bands of both fore and hindwings extremely narrow.

ab. flavofasciata Lempke. Tijdschr. Ent. 1953. 96. p. 267.
 The black marginal band of the forewings is so strongly dusted with yellow scales that the black nervures stand out as black lines. The hindwings usually show more blue dusting on the marginal band.

ab. spuleri Fischer. Soc. Ent. 1908. p. 129.
 = paradoxa Frings. Soc. Ent. 1912. 27. p. 2.
 On the forewings the black marginal band broadens inwards so that it unites with square black costal spot at the end of the discoidal cell and even reaches the second costal spot which crosses the cell. The band curves inwards towards the inner margin and just unites with the blackish basal area. On the hindwings the band reaches and cuts into the cell. The yellow marginal spots are large.

ab. nigrofasciata Rothke. Stett. Ent. 1. 1894. 55. p. 303.
 On the forewings the yellow marginal spots are almost absent as are the yellow marginal moons of the hindwings, the wings are therefore framed by the black marginal bands. The anal eye-spot is half blue, half black.

ab. alberici Dufrane. Bull. Soc. Ent. Belg. 1946. 82. p. 110.
 On the forewings the submarginal lunules are very small and round.

ab. *legrosi* Dufrane. Bull. Soc. Ent. Belg. 1946. 82. p. 110.

On the forewings the submarginal lunules are almost quadrangular and touch each other to form a regular straight band, the veins dividing it are imperceptible. On the hindwings the tails and intervals 1, 2, 3 and 4 are slightly reddish from the inner edge of the black submarginal band as far as the border of the wing.

ab. *marginalis* Robbe. Comp. R. Soc. Ent. Belg. 1895. p. 395. (see Nov. Zool. 2. p. 247.)

On the forewings the yellow marginal spots are not lunate but oblong and the fringes not divided by black veins, the black marginal bands much reduced. Hindwings with the outer margin not dentate.

ab. *elunata* Spengel. Zool. Jahrb. Syst. 1899. 12. p. 345. pl. 17. f. 3. and pl. 18. f. 11.

The marginal yellow spots joined into a continuous stripe, the tips of the wings hooked and some of the veins absent on both fore and hindwings. Peroneural defect.

ab. *spengeli* Reiff. Z. Wiss. Ins. Biol. 1911. 7. p. 311.

On the hindwings the two upper yellow marginal spots are united through the absence of the vein.

Peroneural defect.

ab. *lunatica* Bryk. Mitt. Munch. Ent. Ges. 1914. 5. p. 29. fig.

On the hindwings the two lowest yellow marginal spots are united through the absence of the vein. See plate and description.

ab. *oudemansi* Strand. Ent. Z. 1912. 25. p. 253. (fig. Tijdschr. Ent. 48. pl. 1. f. 1.)

The figure shows the yellow marginal spots of the forewings bordered externally by a faint grey line instead of the normal black

ab. *noviesignata* Uffeln. Jahrb. Westf. Prov. Ver. Wiss. 1922. 51-52. p. 161.

On the forewings the lowest yellow marginal spot connects with the yellow of the median band in a streak along the inner margin.

ab. *brevis* Mezger. Lamb. 1934. 34. p. 55.

On the forewings the black marginal line which runs between the yellow marginal spots and the fringe is cut short at the bottom so that the lowest yellow spot connects right through to the fringe.

ab. *concavifasciatus* Cuno. Ent. Z. 1908. 22. p. 134. fig.

The yellow median squares or divisions of the median band of the forewings are concave on their outer edge.

ab. *convexifasciatus* Cuno. Ent. Z. 1908. 22. p. 134. fig.

The yellow median squares or divisions of the median band of the forewings are convex on their outer edge.

ab. *fontainei* Dufrane. Bull. Soc. Ent. Belg. 1946. 82. p. 107.

On the hindwings at the apex the top two submarginal yellow lunules make a complete junction.

ab. benevittatus Cabeau. Rev. Mens. Soc. Ent. Nam. 1920. 20. p. 18.
= incompletus Maslowscy. Polsk. Pismo. Ent. 1923. 2. p. 130. fig. 8.
On the hindwings the topmost yellow marginal spot is absent.

ab. lunulacarens Lempke. Tijdschr. Ent. 1953. 96. p. 270.
On the forewings one or more of the marginal lunules are lacking, the rest normal.

ab. apertalunulata Lempke. Tijdschr. Ent. 1953. 96. p. 270. pl. 8. f. 16.
On the hindwings one or more of the marginal lunules are open on their outer side through the partial absence of the thin black border line.

ab. bimaculatus Eimer. Arlb. Schmett. 1895. 2. p. 101.
= bipunctata Seitz. Seitz Macrolep. 1907. 1. p. 12.
On the forewings in normal specimens the topmost yellow spot of the median yellow band contains a black spot. In this form there is another black spot in the yellow spot beneath the top one, thus the two top spots each contain a black central spot.

ab. punctellatus Cabeau. Rev. Mens. Soc. Ent. Nam. 1911. 11. p. 77.
On the forewings the black spot, normally seen in the top yellow space of the median band, is reduced to a very little point.
In the original description this yellow space is referred to as cell 8. This should surely be cell 7. It is a very feeble aberration and hardly worth separating from the type form.

ab. immaculatus Schultz. Ill. Wochenschr. Ent. 1897. 2. p. 431. (Descr. not named Ent. 49. p. 105)
= immaculatus Verity. Rhop. Fal. 1906. p. 18.
The black spot, normally seen in the top space of the yellow median band of the forewings, is entirely absent.

ab. diaphorus Cabeau. Rev. Mens. Soc. Ent. Nam. 1911. 11. p. 76.
On the right forewings there is no black spot in the top space of the yellow median band but on the left forewing there is a well developed spot.
An asymmetrical form hardly worthy of a name.

ab. delunulata Stattermayer. (nom. nov. pro demaculata Statt) Lep. Rundsch. 1927. 1. p. 96.
= demaculata Stattermayer. (nom. preoc. Schultz.) Ent. Anz. 1924. 4. p. 134.
Forewings with no black spot present in the top space of the yellow median band and the marginal black band of both wings is extremely narrow. On the hindwings the black cross-bar which closes the discoidal cell is absent.

ab. nobeskyi Albert. Ent. 4. 1896. 10. p. 77. fig.
On the forewings the two top spaces of the yellow median band each contain a black spot as in ab. bimaculatus Eimer and also a black bar or streak is present in the yellow part of the discoidal cell as in ab. melanosticta Reverdin. On the hindwings the black marginal band almost reaches the cross-bar of the discoidal cell. This is a combination of the three forms.

ab. melanosticta Reverdin. Bull. Soc. Lep. Gen. 1910. 2. p. 44. pl. 2. f. 3.
On the forewings in the discoidal cell there is a short black bar or streak, standing out in the yellow area.

ab. *seminigra* Oberthur. Lep. Comp. 1909. 3. p. 103. pl. 24. f. 126.

Forewings with the yellow median band suffused with black from the apex downwards as far as the two lowest cells which are of normal yellow. The yellow costal space nearest the base is also obscured with dark dusting but the yellow marginal spots are much larger than usual. On the hindwings the yellow area is suffused with dark scaling on its edges, as are also the veins. The marginal yellow spots are large.

ab. *pupillata* Caruel. Rev. Fr. Lep. 1951. 13. p. 119.

On the forewings the oval spot in the top space of the yellow median band (cell 7) is strongly pupilled with yellow scales.

ab. *ferenigra* von Rosen. Seitz Macrolep. 1929. Suppl. 1. p. 9.

= ? ab. *ferenigra* Spengel. Zool. Jahrb. Syst. 1899. 12. p. 383. pl. 17. f. 8.

Spengel did not intend this name to be used in the aberrational sense, he figured a specimen which he called ab. *nigrofasciata* Rothke and added after this name, *ferenigra*, meaning merely that it was a very dark example of it.

von Rosen in Seitz Macrolep. Suppl. 1. p. 9 gives the name ab. *ferenigra* Spengel (one word) with the following description - "On the upper surface the costal area of the forewings and on the lower surface the whole of the forewings and part of the hindwings are irrorated with black."

If one accepts the words *ferenigra*, obviously merely descriptive of the particular individual specimen of *nigrofasciata*, as a name, the form can be attributed to Spengel but in my opinion von Rosen becomes the author.

ab. *symmelanus* Lambillion. Rev. Mens. Soc. Ent. Nam. 1913. 13. p. 125.

On the forewings the black costal spot in the discoidal cell unites with the black spot at the end of the cell, reducing the yellow area to a small square instead of the normal yellow square which reaches the median vein. The lower yellow costal square, between the base and the one in the discoidal cell, is present but reduced in size.

The form therefore has the yellow squares on the costa less developed than usual, especially the one in the centre of the costa.

ab. *collacircinata* Mezger. Lamb. 1913. 13. p. 179.

The black costal spot nearest the base of the forewings is in the form of a circle and becomes more prominent than the other costal spot.

ab. *demaculata* Schultz. Soc. Ent. 1911. 26. p. 33.

On the forewings the square black costal spot in the discoidal cell, the one nearest the base, is represented only by a narrow black streak.

ab. *karckzewska* Wlze. Pozn. Towarz. Przyj. Nauk. B. vol. 1. p. 260. (Suppl.)

The third black spot of the forewings is separated from the external edge of the discoidal cell.

The "third" spot is misleading, apparently the author counts the basal black area as the first spot. The third would then be the one at the end of the cell which normally reaches and closes the cell. In this form there is presumably a thin line of yellow between it and the cross-vein at the end of the cell. See sketch by Lempke in Tijdschr. Ent. 96. pl. 8. f. 2.

ab. *confluens* Schultz. Nyt. Mag. Naturv. 1906. 44. p. 107.

The two black costal spots of the forewings fused into one oblong mark, leaving no yellow between them.

ab. latelutea Goodson. Entom. 1959. 92. p. 148.

On both fore and hindwings the normal conspicuous dark submarginal band fails, this area being primrose-yellow, bounded on its inner side by a suffused wavy black line which separates it from the yellow area of the median spaces, and on its outer side by the normal narrow black line on the marginal edge. In other words, the normal yellow marginal lunules are extended completely across to the suffused wavy line, filling each interneural space and thus forming a complete yellow transverse band in place of the normal dark one scaled with blue and black; it is only intersected by the veins outlined in black. the hindwings show just a trace of the normal blue and black scaling in the centre of the outer edge of the median wavy black line.

ab. evittata Spengel. Zool. Jahrb. Syst. 1899. 12. p. 352. pl. 17. f. 2.

= *estrigata* Maxis. (nom. proc. Nitsche). Ent. 1. 1927. 40. p. 425. fig. p. 446.

On the forewings the black marginal band and apical markings completely absent leaving the wings yellow except for the normal dusted base and the two usual black costal spots. The hindwings similar, a thin black marginal line immediately precedes the fringe on all four wings.

ab. postevittata Ekwall. Ent. Tidskr. 1940. 61. p. 33. fig. p. 34.

On the hindwings the dark marginal band is only faintly marked and thinly scaled only the yellow fringe and the narrow black margin which borders the fringe is normal. The marginal band is pallid smoky-grey without any trace of blue, the anal ocellus without blue. Forewings less affected.

ab. clara Rocci. Bull. Soc. Ligust. 1919. 30. p. 114.

An extreme form with a reduction of the bands and black spots and almost total absence of the black veining on all wings and of the black dusting at the base of the wings.

ab. cyanatus Stattermayer. Ent. Anz. 1924. 4. p. 134.

On the hindwings the cross bar closing the discoidal cell is scaled with blue. Also the marginal band is scaled with much brighter blue than usual.

ab. estrigata Nitsche. Verh. zool.-bot. Ges. Wien. 1910. 60. p. (221).

On the hindwings the black cross bar, closing the discoidal cell, is absent.

ab. dissoluta Schultz. Soc. Ent. 1900. 15. p. 58.

= *fenestrella* Cuno. Ent. 1. 1908. 22. p. 133. fig. 1.

= *adaperta* Derenne. Rev. Mens. Soc. Ent. Nam. 1919. 19. p. 36.

On the hindwings the black crossbar which closes the cell is split into two by a thin yellow line, which gives the impression of there being two thin black bars.

ab. biadaperta Mezger. Lamb. 1927. 27. p. 98.

Like *adaperta* Derenne (the preceding) with the cross-bar which closes the discoidal cell, split into two parts by a thin yellow line, but with a black mark dividing it horizontally, leaving a small yellow space at the bottom and a longer yellow space above it. Described as an underside form but placed here since it is so close to the preceding, in which the yellow is continuous and not interrupted by this black mark. It apparently has not been found on the upperside.

ab. dilobatus Cazeau. Rev. Mens. Soc. Ent. Nam. 1911. 11. p. 77.

On the hindwings the two yellow cells on the external edge of the black bar which closes the discoidal cell, are elongated in the form of a lobe which terminates in a point. Each advances into the black marginal band for at least 2 mm. and reach the blue of the band.

ab.conclusa Uffeln. Int.Ent. 3.1923.17.p.27.

= comma Stattermayer. Ent. 3.1924.4.p.134.

On the hindwings there is a black outline, or margin, to the whole of the median cell through the veins being thickened or dusted with black.

ab.diffusa Rocci. Bull. Soc. Ligust. 1919.30.p.15.

On the hindwings more than half the median cell is filled by an extension of the dark basal sabling. The costal margin is similarly affected.

ab.cellularus Oberthur. Lep. Comp. 1909.3.p.103.pl.24.f.125.

On the hindwings the median cell shows a black spot situated on the inner side of black cross bar which closes it and actually touches it.

ab.flammata Blachier. Bull. Soc. Lep. Gen. 1914.3.p.80.pl.2.f.7.

= flammea E.B. (Ecole Bordelaise 1924). Act. Soc. Linn. Bord. 1925.77.p.17.

On the upperside of the hindwings in the yellow cells at the end of the median cell, between the black cross bar and the black marginal band, are two orange streaks or spots. These orange marks can frequently be seen on the underside in the same position, but their appearance on the upperside is much rarer.

ab.castanii Lambillion. Rev. Mens. Soc. Ent. Nan. 1903.p.2.

= rufopunctata Wheeler. Butts. Switz. 1903.p.53.

= rubromaculata Schultz. Nyt. Mag. Naturf. 1904.42.p.39. (nom. preoc. Aign.

On the hindwings upperside there are red or orange spots in the yellow lunules of the upper part of the marginal chain of yellow lunules, most often the topmost. Schultz gives various positions of these spots.

ab.rubromaculatus Aigner. Rev. Lapok. 1899.6.p.95.

A combination of ab.castanii and ab.flammata Blachier the preceding two forms. I have not seen the original description but Lempke says that such combination forms are superfluous. Since however Aigner-Abafi named the form long before castanii and flammata were described I cannot see how this applies (see Fijlschr. Ent. 96.p.269.

ab.bella Stattermayer. Ent. Anz. 1924.4.p.134.

On the hindwings the anal eye spot shows the upper half of a sky-blue, sharply contrasting with the red.

ab.analidilatata . Obraztsov. 3. Ost. Ent. Ver. 1936.21.p.46.

On the hindwings the red of the anal eye spot extends beyond its upper black border and has no blue dusting. The red is also very dark.

ab.benedignata Krulikowsky. Rev. Russe Ent. 1909.9.p.110.

On the hindwings the anal eye spot has a black dividing line cutting between the red and the blue.

ab.intacta Sheljuzhko. Iris 1913.27.p.16.

On the hindwings the red anal eye spot has the upper part of its black border absent and the blue reduced to a thin line.

ab. subintacta Ubratsov. Z. Ost. Ent. Ver. 1936. 21p. 46.

On the hindwings the anal eye spot has no border to its lower edge, lying free on a yellow ground.

ab. rubroanalisis Stattemayer. Ent. Anz. 1924. 4. p. 134.

On the hindwings the anal eye spot has all blue absent, in its place some whitish dusting.

ab. tritis Lambillion. Rev. Mens. Soc. Ent. Nam. 1906. p. 47. (original spelling)

On the hindwings the anal eye spot is ochre yellow instead of the normal blue and red. The insect had a sad and gloomy appearance, the base of the forewings and the black marginal band hardly powdered with a few whitish scales. On the hindwings the blue is replaced by greyish-blue and very little apparent.

ab. xanthophthalma Stauder. Mitt. Munch. Ent. Ges. 1922. 12. p. 17.

On the hindwings the anal eye spot is of a beautiful reddish-yellow.

ab. caeca Closs. Int. Ent. Z. 1916. 10. p. 63.

= exocellatus Cabeau. Rev. Mens. Soc. Ent. 1923. 23. p. 29.

On the hindwings the anal eye spot is absent, the submarginal band is therefore brought nearer to the anal angle.

ab. circinnatus Sibille. Lamb. 1927. 27. p. 74.

The apex of the forewings is rounded, the tails of the hindwings short and broadened.

ab. gynaeotropia Bryk. Opuscula Ent. 1953. 18. p. 65. fig.

The description is long and involved. The figure shows an example very similar to ab. evittata Spengel but the forewings have a somewhat wider marginal black line inwardly dentate. On the inner margin there is a rather large square black spot with a smaller one above it, all that remains of the usual black marginal band. In evittata this is absent altogether. On the hindwings the only marking is a black line on the extreme margin, with no yellow spaces on its outer edge, these are present in evittata. Spengel's evittata is figured in Frohawk's Vars. Brit. Butts. pl. 46. f. 1.

ab. pierardi Dufrane. Bull. Soc. Ent. Belg. 1946. 82. p. 111.

The specimen had deformed wing shape with a corresponding alteration in wing pattern. The description is almost impossible to follow and since such things do not deserve a name it is not given here. The main points however are a strongly curved costa with the intervals 8, 9, 10 and 11 greatly widened.

ab. angulata Verity. Rhop. Pal. 1911. p. 296. pl. 60. f. 14.

The forewings narrower and more pointed because of their more oblique outer margin. The hindwings narrower and more elongate.

ab. furcata Dufrane. Bull. Soc. Ent. Belg. 1946. 82. p. 109.

Upperside of the forewings with the nervures very black and broad being strongly dusted with black scales. Vein 6 before its arrival at the black submarginal band carries a thick black streak directed upwards and forming a very characteristic fork with this nervure. A black longitudinal streak travelling towards the middle of the yellow space starts from the base of vein 8. On the hindwings the last two of the yellow marginal lunules are united along the black antemarginal band.

ab. watzkai Garbowski. Soc. Ent. 1892. 5. p. 154.

The forewings elongated, the fringes and unbroken line. See complicated description.

ab. drusus Fuchs. Stett. Ent. Z. 1884. p. 241.

= zancleus Gelin. Cat. Lep. l'Ouest France 1913. p. 23.

Aberrant body parts. The black streak from the head, over the thorax, to the hindpart of the body, is much narrower than normal and the wing covers appear not merely longer, but thicker and pure yellow.

ab. zancleusoides Ragusa. Nat. Sic. 1916. 23. p. 31.

Aberrant body. The abdomen completely white above and below, hardly spotted with black at the base. It is similar to ab. zancleus of P. podalirius.

ab. minor Bois-Reymond. Int. Ent. Z. 1926. 20. p. 103.

= minor Pionneau. Misc. Ent. 1930. 32. no. 6. p. 4. (nom. preoc. B.-Reym.)

= minor Lhomme. Amat. Pap. 1933. 6. p. 232. (nom. preoc. B.-Reym.)

Small examples.

ab. standfussi Fuchs. ? (nom. nud.) Int. Ent. Z. 1925. 19. n. 63.

Fuchs under this reference mention an ab. standfussi with no author and no description. I cannot trace any further reference to the form.

ab. occlusa Lempke. Tijdschr. Ent. 1953. 96. p. 268. pl. 8. f. 13.

On the underside of the hindwings the thin black marginal line which normally ceases before reaching the anal angle, continues on and meets the black line on the upper part of the anal eye, thus enclosing it in a thin black frame.

ab. nervosa Dufrane. Bull. & Ann. Soc. Ent. Belg. 1946. 82. p. 107.

The chief character lies on the underside where all black markings especially those surrounding the cells are very greatly broadened and deep black as is also the abdominal border of the hindwings. The subcostal forms a real band of almost 2 mm. in width.

ab. rufa Pionneau. Echange 1924. no. 416. 39. p. 23.

On the underside of the hindwings red or orange spots appear in the yellow marginal spots. Similar to the upperside form ab. castanii but orange spots on the underside appear to be less usual than on the upperside and do not necessarily occur on the same insect. This form is restricted to the underside only.

machaon abberational forms etc.
Sketches.



Gynaeceia B. & H.

INDEX

| | | | |
|--------------------------|----|--------------------------|----|
| albalinea Froh. | 2. | suffusa-alcoides Tutt. | 1. |
| alcoides Tutt. | 1. | suffusa-transversa Tutt. | 1. |
| approximata Lowe. | 2. | suffusa-variegata Tutt. | 1. |
| baynesi Hugg. | 2. | torquatilla Kauffm. | |
| brunnea-alcoides Tutt. | 1. | transversa Tutt. | 1. |
| brunnea-transversa Tutt. | 1. | | |
| brunnea-unicolor Tutt. | 1. | | |
| brunnea-variegata Tutt. | 1. | unicolor Frr. | 1. |
| cervantes da Silv.-Cr. | | variegata Tutt. | 1. |
| clarus Carad. | 3. | | |
| coelestina Staud. | 2. | | |
| fulva Tutt. | 1. | | |
| isabellae Lamb. | 2. | | |
| minima Lamb. | 2. | | |
| poliodes Cab. | 2. | | |
| posticeprivata Staud. | 2. | | |
| pseudobrunnea Tacc. | 2. | | |

tages Linnaeus. Syst. Nat. 1758. X. p. 485.

aberrational forms etc.

ab. fulva Tutt. Brit. Lep. 1906. 8. p. 266.

The ground colour pale raw umber-brown with a well pronounced series of white spots. The forewings have a whitish median area and well-developed dark raw umber-brown fasciae.

ab. transversa Tutt. Brit. Lep. 1906. 8. p. 265.

Drab brown, with the transverse markings well-developed.

ab. variegata Tutt. Brit. Lep. 1906. 8. p. 265.

Drab brown, with a strongly grey median area.

ab. suffusa-variegata Tutt. Brit. Lep. 1906. 8. p. 265.

Blackish fuscous, with strongly grey median area.

ab. brunnea-variegata Tutt. Brit. Lep. 1906. 8. p. 265.

Warm fuliginous brown, with strongly grey median area.

ab. brunnea-transversa Tutt. Brit. Lep. 1906. 8. p. 265.

Warm fuliginous brown, with well-developed transverse markings.

ab. suffusa-transversa Tutt. Brit. Lep. 1906. 8. p. 265.

Blackish fuscous, with well-developed transverse markings.

ab. alcoides Tutt. Brit. Lep. 1906. 8. p. 265.

Drab ground colour with ill-developed transverse markings.

ab. brunnea-alcoides Tutt. Brit. Lep. 1906. 8. p. 265.

Warm fuliginous brown, with ill-developed transverse markings.

ab. suffusa-alcoides Tutt. Brit. Lep. 1906. 8. p. 265.

Blackish fuscous, with ill-developed transverse markings.

ab. unicolor Freyer. Neu Beitr. 1862. 6. p. 37. pl. 505. f. 1.

All the wings of a uniform brownish-black. The underside somewhat lighter. In the figure no transverse bands are visible.

ab. brunnea-unicolor Tutt. Brit. Lep. 1906. 8. p. 265.

Warm fuliginous brown, with the transverse markings obsolete.

ab.pseudobrunnea Taccani. Boll.Soc.Ent.It.1949.79.p.4.

Warm fuliginous brown,with (presumably)typical markings.

Taccani says of pseudobrunnea that it has the features of brunnea Tutt. Tutt however did not name "brunnea" as an individual aberration,only in combination with other markings(see preceding page).Verity has raised "brunnea Tutt" to the rank of subspecies so Taccani says that specimens like it occurring in other races should be called pseudobrunnea. Since Tutt did not give a description for an ab.brunnea it is assumed that it is of the same colour as the combination forms but with typical markings.

ab.poliodes Cabeau. Rev.Mens.Soc.Ent.Nam.1920.20.p.19.

Upperside of the forewings pale brownish,the pattern feebly marked,the fringe whitish. Hindwings almost entirely whitish,the fringe white with no clear dots.

ab.approximata Lowe in Wheeler.Butts.Switz.1903.p.8.

"So called because approaching the Greek var.unicolor."

The description is very indefinite.Presumably it is almost unicolorous brownish-black with the markings less developed than normal.In unicolor they are absent.

ab.isabellae Lambillion. Rev.Mens.Soc.Ent.Nam.1902.p.15.

The chief character is the violaceous reflection which is truly remarkable.Velvety brownish-black,very strong,with the greyish band very broad,paler and more sharply defined. Hindwings blacker than in the type form with the white marginal dots more visible and better formed.

ab.coelestina Stauder. Int.Ent.Z.1915.8.p.183.

Upperside of the forewings bluish-grey,somewhat irridescent,also the fringes. Hindwings of a uniform dark brown,the fringes violet-grey.The white marginal spots on the fringes are absent on all wings. On the underside the apex of the forewings is of a beautiful violet and there is a light row of spots in front of the fringes and a second row 3 mm.from the outer ones.

ab.posticeprivata Stauder. Mitt.Munch.Ent.Ges.1924.14.p.66.

On the hindwings all the light marginal spots are absent.

ab.clarus Caradja. Iris.1895.8.p.61.

A light grey specimen,similar to other light coloured examples from Amasia. Caradja does not say more than this.

ab.albalinea Frohawk. Vars.Brit.Butts.1938.p.192.pl.47.f.5.

On the upperside of the forewings there is a row of whitish submedian spots from the costa,a little before the apex,down to the inner margin. Hindwings normal.

ab.minima Lambillion. Cat.Lep.Belg.Add.1906.p.432.

Only half the size of normal specimens.

tages

subsp.baynesi Huggins. Entom.1956.89.p.241.

The race from the Burren,Co.Clare,Ireland. See description.

INDEX

| | | | |
|------------------------------|----|----------------------------|----|
| <i>albina</i> Oberth. | 1. | <i>reducta</i> Warr. | 2. |
| <i>albina</i> Tutt. | 1. | <i>restricta</i> Tutt. | 2. |
| <i>alboinspersa</i> Vty. | 2. | <i>rufa</i> Tutt. | 3. |
| <i>althaeae</i> Esp. | 2. | | |
| <i>alveolus</i> Hübn. | 2. | | |
| | | <i>scabellata</i> Rev. | 1. |
| | | <i>semiconfluens</i> Rev. | 2. |
| <i>bilineata</i> Rev. | 1. | | |
| <i>brunnea</i> Tutt. | 1. | | |
| | | <i>taras</i> Bergstr. | 2. |
| <i>fasciata</i> Tutt. | 2. | | |
| <i>fritillum</i> Fabr. | 2. | <i>zagrabiensis</i> Grund. | 1. |
| <i>intermedia</i> Oberth. | 1. | | |
| <i>intermedia</i> Schilde. | 1. | | |
| <i>lavaterae</i> Haw. | 2. | | |
| <i>luctuata</i> Vty. | 3. | | |
| <i>marginocelongata</i> Rev. | 1. | | |
| <i>moryi</i> Strand. | 2. | | |
| <i>mulleri</i> Diosz. | 2. | | |
| <i>pseudotaras</i> Lacr. | 2. | | |
| <i>punctifera</i> Fuchs. | 2. | | |

malvae Linnaeus. Syst. Nat. 1758. X. p. 485.

aberrational forms etc.

ab. brunnea Tutt. Brit. Lep. 1906. 8. p. 224.

The ground colour of the upperside brown instead of black.

ab. albina Tutt. Brit. Lep. 1906. 8. p. 224.

= albina Oberthur. Lep. Comp. 1910. 4. p. 396. pl. 37. f. 238.

The ground colour of the upperside greyish-white instead of black.

Oberthur's example was described from the same specimen.

ab. scabellata Reverdin. Bull. Soc. Lep. Gen. 1910. 2. p. 153. pl. 16. f. 3.

On the upperside of the forewings the two lowest white spots, those on the inner margin, are united to form a short white line, the other spots are normal in size.

ab. bilineata Reverdin. Bull. Soc. Lep. Gen. 1914. 3. p. 37. pl. 3. f. 4.

On the upperside of the forewings with two white horizontal lines just above the inner margin, caused by the union of the lower white spots of the two bands. Like the preceding scabellata but with two short white lines instead of one.

ab. marginoelongata Reverdin. Bull. Soc. Lep. Gen. 1914. 3. p. 37. pl. 3. f. 10.

On the upperside of both fore and hindwings the white marginal spots, normally very small, are elongated into streaks or lines, giving a rayed effect. They do not connect up with the main row of spots nor with the chequered fringe from which they are separated by a thin black line. The rest of the markings normal.

ab. zagradiensis Grund. Ent. Z. 1903. 17. p. 49. fig. b.

On the upperside of the forewings the outer transverse row of white spots are united with each other to form a complete white line from costa down to the inner margin. The fringes are not chequered. The hindwings markings are obsolete except for two narrow white marks on the costa. The black chequerings of the fringe are absent. Peroneural defect.

ab. intermedia Schilde. Berl. Ent. Z. 1886. 30. p. 55.

Forewings on the upperside normal, the hindwings as in ab. taras, with only the one white spot in the centre and row of small white marginal spots.

This is quite a common form and very different from the following form of the same name (unfortunately preoccupied by this first intermedia). It is hardly intermediate between the type and taras, as Oberthur's form certainly is.

ab. intermedia Oberthur. (nom. preoc. Schilde). Lep. Comp. 1910. 4. p. 394. pl. 54. f. 457.

The white markings of the upperside intermediate between the type and ab. taras. The white spots above the inner margin of the forewings are united into an oblong blotch and the discoidal spot is united with the next spot into another oblong blotch. Hindwings with a row of white marginal spots and one spot in the middle of the wing.

ab.taras Bergstrasser. Nomenclatur 1780.4.p.40.pl.XCI.f.5-6.

= althaeae Esper. Eur.Schmett.1781.1.p.4 and p.149.

= fritillum Fabricius. Mantissa Ins.1787.2.p.91.

= lavaterae Haworth. Lep.Brit.1803.p.52.

= alveolus Hubner. Samml.Eur.Schmett.1823.1.pl.171.f.847-8.

On the upper and underside the white spots of the forewings are confluent, forming a large white central area. Hindwings with the white spots reduced to a single one in the centre of the wing and a row of small white marginal spots.

ab.semiconfluens Reverdin. Bull.Soc.Lep.Gen.1911.2.p.73 footnote.pl.11.f.3.

Described under *P.malvodes* Elwes & Edwards which is now regarded as a subspecies of *malvae*, Verity and Lempke therefore include it as an aberration of *malvae*.

On the upperside of the forewings all the white spots are considerably elongated, enlarged, and tend to unite. On the hindwings, on the other hand, there only remains an antemarginal festoon and in the centre a white spot.

ab.mulleri Dioszeghy. Verh.Siebenburg ver.Nat.1930.79-80.p.218.

The white markings of the upperside of the hindwings extensive in the same way as those of the forewings are in *ab.taras*. The forewings white spots however are small only those around the discal cell being larger. The white streaks in the marginal area are very distinct.

ab.alboinspersa Verity. Bull.Soc.Ent.It.1916.47.p.65.

Described under *P.malvodes* which is now regarded as a subspecies of *malvae*.

The upperside intensely sprinkled with white atoms.

ab.fasciata Tutt. Brit.Butts.1896.p.123.

On the upperside of the hindwings the white spots are united to form a band in the central area.

ab.punctifera Fuchs. Jahrb.Nass.Ver.Nat.1889.42.p.201.

= restricta Tutt. Brit.Lep.1906.8.p.224.

The spots of the forewings unusually small or reduced, some absent.

Tutt's *restricta* had the spots of the fore and hindwings distinctly reduced, some quite obsolete.

ab.reducta Warren. Trans.Ent.Soc.Lond.1926.p.76.

On the underside of the hindwings the central spot of the median band has a straight inner edge. A common aberration, the projection from this central spot is always slight and very little reduction of it makes it quite straight.

ab.moryi Strand. Nyt.Mag.Naturv.1902.40.p.141.also p.163-164.

On the underside of the hindwings the white spots of the transverse band are joined, whilst the fourth and sixth nervures show between them a white united spot.

ab.pseudotaras Lacreuze. Bull.Soc.Lep.Gen.1910.2.p.44.pl.3.f.5.

The underside is like *ab.taras* Bergstr., with the white spots of the forewings confluent. On the upperside the spots are not confluent but enlarged and well-marked, the chief character of the aberration is the confluence of spots on the underside of the forewings.

ab.rufa Tutt. Brit.Lep.1906.8.p.224.
The underside of a bright ruddy hue.

ab.luctuata Verity. Bull.Soc.Ent.It.(1913)1914.45.p.233.
Underside of the hindwings blackish-brown instead of the normal colour.

INDEX

| | | | |
|-----------------------|----|---------------------|----|
| albinotica Goods. | 3. | melicertes Schultz. | 2. |
| aurantia Tutt. | 1. | | |
| | | nigra Der. | 1. |
| bolleti Der. | 2. | | |
| | | pulchra Car. | 2. |
| carrueli Le Ch. | 2. | | |
| carueli Le Ch. | 2. | | |
| circumcincta Tutt. | 2. | restricta Tutt. | 1. |
| confluens Osth. | 2. | | |
| conjuncta Blach. | 2. | | |
| | | scabellata Lpke. | 2. |
| | | silvoides Müll. | 2. |
| depuncta Car. | 1. | | |
| | | | |
| ederi Schaw. | 2. | | |
| esperl Tutt. | 2. | | |
| excessa Tutt. | 1. | | |
| extrema Diosz. | 1. | | |
| | | | |
| habeneyl Sieg. | 1. | | |
| | | | |
| infralba Vty. | 3. | | |
| infralutea Lpke. | 3. | | |
| | | | |
| lutea-excessa Tutt. | 1. | | |
| luteana Cab. | 2. | | |
| lutea-restricta Tutt. | 1. | | |

palaemon Pallas. Reise Russl. 1771. 1. p. 471.
= paniscus Fabricius. Syst. Ent. 1775. p. 531.

aberrational forms etc.

ab. aurantia Tutt. Brit. Lep. 1906. 8. p. 195.

On the upperside of the hindwings the spots are large, orange in colour, sometimes with a tendency to coalesce, and with the interneural series of marginal spots inconspicuous.

ab. excessa Tutt. Brit. Lep. 1906. 8. p. 195.

On the upperside of the hindwings the spots are large, orange, and with the marginal interneural series conspicuous.

ab. lutea-excessa Tutt. Brit. Lep. 1906. 8. p. 195.

On the upperside of the hindwings the spots are yellow, not orange, large and with the marginal series conspicuous.

ab. restricta Tutt. Brit. Lep. 1906. 8. p. 195.

On the hindwings upperside the spots are small and restricted, often fewer in number, orange in colour and with the marginal series obsolete.

ab. lutea-restricta Tutt. Brit. Lep. 1906. 8. p. 195.

On the hindwings the spots of the upperside are yellow, not orange, small and restricted, often fewer in number and with the marginal series obsolete.

ab. habeneyi Siegel. Ent. Z. 1921. 35. p. 51. and Int. Ent. Z. 1921. 15. p. 144.

On the upperside of the hindwings the yellow antemarginal spots are completely absent and the spot in the median cell is very small, point-like.

This is actually covered by ab. restricta Tutt, but is more definite regarding the spot in the median cell.

ab. depuncta Caruel. Lamb. 1939. 39. p. 120. pl. 7. f. 4.

On the upperside of the hindwings the antemarginal yellow spots are completely absent. The figure shows the median spots normal, three in number.

This is also very similar to restricta Tutt in its main character.

ab. extrema Dioszeghy. Verh. Siebenburg Ver. Nat. 1930. 79-80. p. 218.

A great reduction of the yellow spots of which there remains on the hindwings only the central one.

ab. nigra Derenne. Rev. Mens. Soc. Ent. Nam. 1919. 19. p. 38.

The forewings are so charged with black that the yellow spots are restricted to form mere lines. On the hindwings the marginal spots are almost invisible.

ab. scabellata Lampke. Tijdschr. Ent. 1953. 96. p. 250.

On the upperside of the forewings the lower basal spot connects with the lower discal spot so that a yellow-brown line extends along the inner margin.

ab. silvoides Müller. Verh. zool.-bot. Ges. Wien. 1920. 70. p. (52) fig. 3.

The forewings with the outer rows of yellow spots united to form a broad yellow marginal band which, divided by the black veins, has a rayed effect. The hindwings are very dark with only three clear spots, one in the median cell and two beneath it, the marginal series being only faintly indicated.

The author says that the median cell is completely golden-yellow but the figure does not show this.

ab. luteana Cabeau. Lamb. 1926. 26. p. 10.

= pulchra Caruel. Lamb. 1939. 39. p. 120. pl. 7. f. 5.

On the upperside of the forewings the basal half is almost entirely covered by a yellow area or large blotch.

Caruel's pulchra had the disc of the forewings invaded by the yellow, the black band being almost completely obliterated especially in its lower part.

ab. conjuncta Blachier. Bull. Soc. Lep. Gen. 1910. 2. p. 57. pl. 1. f. 11-12.

= confluens Osthelder. Schmiett. Sudbayern, 1925. 1. p. 159.

On the upperside of the hindwings the outer rows of yellow spots coalesce into a large area divided by the black veins, only the yellow spot in the median cell remaining separated.

Osthelder's confluens had the central row of spots, together with the submarginal spots, flowing together to form a band filling the whole breadth of the wing.

ab. ederi Schawerda. Verh. zool.-bot. Ges. Wien. 1923. 73. p. (4).

The forewings with the exception of the discal cell are blackish darkened. The hindwings are normal but the ground colour is more black than brown.

ab. esperi Tutt. Brit. Lep. 1906. 8. p. 196.

Described from the figure in Esper Eur. Schmiett. 2. pl. XCV. f. 5. which shows the forewings completely black. The hindwings with two of the marginal spots uniting with the two of the central row to form streaks and the other yellow spots very small, the wings appearing very dark.

ab. carueli Le Charles. Encycl. Ent. (Lep.) 1927. 2. p. 150. pl. 9. f. 5. (Correct. Lamb. 39. p. 122)

= carrueli Le Charles. (in error)

= bolleni Derenne. Lamb. 1936. 36. p. 63.

The figure of the type shows the forewings completely black. The hindwings on the other hand have the two outer rows of yellow spots united forming a broad yellow marginal band, only the yellow spot in the median cell remaining separated.

Derenne's description is practically the same.

ab. melicertes Schultz. Iris. 1902. 15. p. 321.

Forewings completely black. Hindwings normal. On the underside the hindwings are somewhat darker.

ab. circumcincta Tutt. Brit. Lep. 1906. 8. p. 196.

On the underside the yellow spots of the hindwings are distinctly edged with darker.

ab. *infralutea* Lempke. Tijdschr. Ent. 1953. 96. p. 250.

Underside of the hindwings of a beautiful clear yellow, the spots somewhat paler.

ab. *infralba* Verity. Farf. Diurn. It. 1940. 1. p. 91. pl. 3. f. 95.

On the underside of the hindwings the spots are whitish-yellow but not so silvery-white as those of the Siberian race *albiguttata* Christ.

ab. *albinotica* Goodson. Ent. Gaz. 1960. 11. p. 18.

Albino. All the dark markings replaced by pale brownish-grey, the ground colour normal.



silvaceus m. Thun.



conjugata Black.



estheri Tutt.



carueta Le Charles.

INDEX

| | |
|-------------------|----|
| antiardens Lpke. | 1. |
| ardens Oberth. | 1. |
| brunnea Tutt. | 1. |
| clara Tutt. | 1. |
| fulva Lpke. | 1. |
| intermedia Tutt. | 2. |
| major Tutt. | 1. |
| major-clara Tutt. | 1. |
| marginatus Pic. | 1. |
| pallida Mosl. | 1. |
| pallida Tutt. | 1. |
| semicolon Stdgr. | 1. |
| sinelinea Lpke. | 1. |
| suffusa Tutt. | 1. |

lineola Ochsenheimer. Schmiett. Eur. 1808. 1. pt. 2. p. 230.

aberrational forms etc.

ab. pallida Mosley. Nat. Journ. 1896. Suppl. p. 19. vol. 5. (1896 Aug.)
 = pallida Tutt. Brit. Butts. 1896. p. 136. (1896 Oct)
 = ardens Oberthur. Lep. Comp. 1910. 4. p. 356. pl. 37. f. 243.
 The ground colour yellowish-white.

ab. fulva Lempke. Tijdschr. Ent. 1953. 96. p. 252.
 The ground colour brownish-yellow, distinctly paler than typical.

ab. clara Tutt. Brit. Lep. 1906. 8. p. 96.
 Clear golden brown with clear-cut narrow marginal black line.
 Now regarded as a Continental race although Tutt described it as ab. aberration.

ab. brunnea Tutt. Brit. Lep. 1906. 8. p. 96.
 The wings of a deep chocolate-brown.

ab. suffusa Tutt. Brit. Lep. 1906. 8. p. 96.
 With well-developed margins and nervures, the discoidal nervure not black.

ab. marginatus Picard. Lamb. 1948. 48. p. 40.
 Female. The upperside of the hindwings with a dark border enlarged to occupy one fifth of the wings.

ab. sinelinea Lempke. Tijdschr. Ent. 1953. 96. p. 253.
 The androconial line on the upperside of the forewings is so pale that it is hardly, or not at all, to be seen.

ab. antiardens Lempke. Ent. Ber. (Amst.) 1939. 10. p. 121.
 The black parts of the wings fail, leaving them uniform yellowish-brown. The form corresponds exactly with ab. antiardens Oberthur of T. sylvestris.
 Almost certainly an albino.

ab. semicolon Staudinger. Iris 1892. 5. p. 282.
 The discal streak of the male thicker and the little stroke beneath it blacker.

ab. major Tutt. Brit. Lep. 1906. 8. p. 96.
 Large specimens 32-33 mm.
 Considered to be a Continental subspecies by Verity but was described as an ab. by Tutt.

ab. major-clara Tutt. Brit. Lep. 1906. 8. p. 96.
 Large specimens of ab. clara Tutt. 32-33 mm.

ab.intermedia Tutt. Brit.Lep.1906.8.p.96.

In size intermediate between the type and ab.major but having the heavier build of major. Size 30-31 mm.

Now regarded as a Continental race so need not be used in Britain.

INDEX

| | |
|--|----|
| <i>antiardens</i> Oberth. | 1. |
| <i>brunnea</i> Vty. | 2. |
| <i>iberica</i> Tutt. see <i>pseudoiberica</i> Tacc. | 2. |
| <i>imminuta</i> Kauffm. no descr | 1 |
| <i>intermedia</i> Froh. | 1. |
| <i>lategrisea</i> Vty. | 1. |
| <i>latenigra</i> Vty. | 1. |
| <i>lepontica</i> Kauffm. no descr | 2 |
| <i>macta</i> Vty. see <i>major</i> Tutt. | 2. |
| <i>major</i> Tutt. | 2. |
| <i>margarita</i> Froh. | 1. |
| <i>obscura</i> Tutt. | 1. |
| <i>pallida</i> Tutt. | 1. |
| <i>pallida-virescens</i> Tutt. | 1. |
| <i>pallidiscus</i> Strand. | 1. |
| <i>pseudoiberica</i> Tacc. | 2. |
| <i>reversa</i> Tutt. | 1. |
| <i>suffusa</i> Tutt. | 2. |
| <i>suffusa-virescens</i> Tutt. | 2. |
| <i>thaumatana</i> Strand. | 1. |

1.

- sylvestris Poda. Mus. Graec. 1761. p. 79.
 = flava Brunniche. Pont. Danske Atlas. 1763. 1. p. 685.
 = thaumas Hufnagel. Berl. Mag. 1766. 2. p. 62.
 = linea Muller. Mel. Soc. Turin. 1766. 3. p. 192.

aberrational forms etc.

ab. pallida ~~Macleay~~ Naturalists. J. 5. suppl. p. 18. 1883.

= ab. pallida Tutt. Brit. Lep. 1906. 8. p. 107.

= margarita Frohawk. Vars. Brit. Butts. 1938. p. 195. pl. 47. f. 2.

The ground colour extremely pale, yellowish-white.

Tutt's pallida was bone-coloured or whitish, tinged with yellow.

Frohawk's margarita was yellowish-white.

Lemke includes ardens Oberthur as a synonym but Oberthur says that this was an aberration of T. lineola.

ab. intermedia Frohawk. Vars. Brit. Butts. 1938. p. 195. pl. 47. f. 3.

The ground colour pale straw-yellow.

This is less whitish than the preceding.

ab. pallidiscus Strand. Ent. Z. 1912. 25. p. 258. (fig. Tijdschr. Ent. 48. pl. 5. f. 13.)

Forewings upperside with a whitish cloud or spot in the centre, also seen on the underside. Hindwings with a similar white mark on the upperside only.

ab. pallida-virescens Tutt. Brit. Lep. 1906. 8. p. 107.

The forewings of a silver bone-colour, the hindwings shot with iridescent green.

ab. reversa Tutt. Brit. Lep. 1906. 8. p. 107.

= antiardens Oberthur. Lep. Comp. 1910. 4. p. 666. pl. 37. f. 242. (descript. p. 357.)

The body and blackish parts of the wings of a yellowish-blond, paler than the normal ground colour. The discal streak of the forewings is silver-grey.

ab. thaumatana Strand. Arch. Naturg. 1919. 85. 44. p. 19.

The discal streak of the male, usually broken on vein 2, shows no sign of a break.

ab. latenigra Verity. Boll. Lab. Zool. Portici. 1920. 14. p. 43.

A wide black border reaching from the margin half way to the discal cell, its inner edge extending along the veins in elongated serrations. The discocellulars black.

ab. lategrisea Verity. Boll. Lab. Zool. Portici. 1920. 14. p. 43.

A wide border as in the preceding latenigra Vty. but of a pale grey instead of black.

ab. obscura Tutt. Brit. Lep. 1906. 8. p. 107.

Rather darker than typical ground colour, being particularly suffused on the hindwings.

ab.suffusa Tutt. Brit.Lep.1906.8.p.107.
Dark brown on all wings.

ab.suffusa-virescens Tutt. Brit.Lep.1906.8.p.107.
Forewings from the base to the anal angle, right round for some distance into the costa, broadly suffused with dark greenish. Hindwings quite as dark as those of *T. actaeon*, the small proportion of tawny showing up vividly.

ab.brunnea Verity. (nec. Tutt.) Farf.Diurn.It.1940.1.p.100.
Verity credits Tutt with this name and says it is the same form as found in *A. lineola* which was of a deep chocolate brown.
Tutt did not name any *brunnea* so the name and description must be under Verity.
It would appear that Verity meant "suffusa" Tutt, but chocolate-brown is rather different from just dark brown, the tint given by Tutt for *sylvestris*. Tutt however did name *brunnea* in *lineola*, which was of a deep chocolate brown.

ab.pseudoiberica Taccani. Boll.Soc.Ent.It.1949.79.p.6.
Bright golden-brown ground colour with a narrow clear-cut marginal black line. The female with no trace of the discoidal lunule.
Named as being an aberration similar to *iberica* Tutt, which was raised to subspecific rank by Verity.

ab.major Tutt Brit.Lep.1906.8.p.107. (renamed *macta* Verity)
Raised to subspecific rank by Verity and no longer named as an aberration.

ab. pseudoiberica Taccani Boll. Soc. Entom. It. 1949. 79. p. 6.
ab. major Tutt Brit. Lep. 1906. 8. p. 107. (renamed *macta* Verity)

acteon Rottenburg. Naturf. 1775. 6. p. 30.

aberrational forms etc.

ab. pallida Frohawk. Vars. Brit. Butts. 1938. p. 196.

All wings pale straw.

ab. clara Tutt. Brit. Lep. 1906. 8. p. 119.

More golden-brown than the fuscous type form, the pale markings blending more markedly with the ground colour.

Raised by Verity to the rank of subspecies in Farf. Diurn. It. 1943.

ab. virescens Tutt. Brit. Lep. 1906. 8. p. 118.

"Extreme British males are very dark and tinged with green."

Verity raises this to subspecific rank in his Farf. Diurn. It. but it certainly is not constant in Britain, the name is therefore left in these British aberrations as occurring occasionally in this class.

ab. distincta Tutt. Brit. Lep. 1906. 8. p. 119.

With distinct pale markings on the hindwings as well as on the forewings. The type has them only on the forewings.

ab. obsolete Tutt. Brit. Lep. 1906. 8. p. 119.

With the usual pale markings absent on the forewings and the hindwings typical, with no markings.

ab. extensa Tutt. Brit. Lep. 1906. 8. p. 119.

The angulated row of pale spots on the forewings unites with the discoidal spot making a blotch which occupies the greater part of the costal area from the angulated row almost to the base.

ab. pallidepincta Lempke. Tijdschr. Ent. 1953. 96. p. 257.

Female. The spots on the upperside pale yellow to yellowish-white.

ab. alba Bolton. Entom. 1951. 84. p. 63.

Female. On the upperside both fore and hindwings have a black ground colour instead of the normal golden-olive, the basal halves have a thin coating of pale straw-coloured scales. The crescentic band of linear markings on the forewings is pure white, the fringes greyish-yellow, the over-all effect being black and white. Underside pale yellow except for the cream-coloured band.

INDEX

albescens Oberth. 1.

centripuncta Tutt. 1.

clara Tutt. 1.

conflua Tutt. 2.

dupuyi Oberth. 1.

extrema Tutt. 1.

faunula Oberth. 2.

flava Tutt. 2.

guernisaci Oberth. 1.

immaculata Fern. 1.

intermedia Tutt. 1.

juncta Tutt. 2.

lorenzi Kauffm. no descr 2

nigrocincta Skala. no descr 2

pallida Mosl. 1.

pallidapuncta Tutt. 1.

suffusa Tutt. 1.

suffusa ? no descr 2.

comma Linnaeus. Syst. Nat. 1758. K. p. 484.

aberrational forms etc.

ab. pallida Mosley. Nat. Journ. 1896. Suppl. 5. p. 19.

All wings with yellowish-bone ground colour as in the same form of sylvanus.

ab. clara Tutt. Brit. Lep. 1906. 8. p. 156.

Bright fulvous, almost unspotted (slight traces only towards the apex of the forewings), and the usual marginal border almost obsolete.

ab. intermedia Tutt. Brit. Lep. 1906. 8. p. 156.

Bright fulvous, the marginal border fuscous, the spotting on both fore and hindwings faint.

ab. suffusa Tutt. Brit. Lep. 1906. 8. p. 156.

The ground colour suffused with fuscous, the fulvous being restricted to the angulated row of spots and the discal cell of the forewings, and the transverse row and discal spot of the hindwings.

ab. extrema Tutt. Brit. Lep. 1906. 8. p. 156.

Almost entirely fuscous, the spots much reduced on the forewings, almost absent on the hindwings.

ab. pallidapuncta Tutt. Brit. Lep. 1906. 8. p. 156.

The ground colour suffused with fuscous as in ab. suffusa but the spots yellowish, even whitish, towards the apex of the forewings.

ab. albescens Oberthur. Lep. Comp. 1910. 4. p. 361. pl. 37. f. 241.

The dark parts and markings on all wings replaced by grey or silver-grey. Albino.

ab. immaculata Fernandez. Bol. Soc. Ent. Esp. Zaragoza. 9. 8. p. 158.

The spots on the upperside of both fore and hindwings absent. On the underside the hindwings show just a trace of the spots.

ab. centripuncta Tutt. Brit. Lep. 1906. 8. p. 157.

= guernisaci Oberthur. Lep. Comp. 1910. 4. p. 361. (fig. Etudes 20. pl. 6. f. 86)

On the underside the white spots are obliterated by being suffused with dark scales, only one small clear central spot remains in the centre.

Tutt and Oberthur described the same specimen. The figure in Etudes shows no sign of the one small white central spot but Oberthur mentions it in his description.

ab. dupuyi Oberthur. Lep. Comp. 1910. 4. p. 360. pl. 37. f. 240.

On the underside of the hindwings the silver spots of the outer row are reduced to the three top ones with an indistinct fourth, the lower ones are obsolete.

ab. juncta Tutt. Brit. Lep. 1906. 8. p. 156.

= faunula Oberthur. Lep. Comp. 1910. 4. p. 361. (fig. Etudes 20. pl. 6. f. 85.)

On the underside of the hindwings the white spots are united into one large blotch so that only a pale shade remains in the centre.

Tutt and Oberthur described the same specimen. Oberthur's figure shows all the white spots joined together to form a complete circle, the centre being pale brownish.

ab. conflua Tutt. Brit. Lep. 1906. 8. p. 157.

On the underside of the hindwings the outer white spots are united into a large zigzag mark.

ab. flava Tutt. Brit. Butts. 1896. p. 129.

On the underside the spots are yellow, almost lost in the ground colour and markedly obsolete.

ab. nigrocincta Skata Ab Ent. Ges. Landesmus. Brün. 1936 no 3. 125

ab. Lorenzi Hartmann Mitt. Ent. Ges. Basel 1951 5. 1-5 fig.

ab. stylisa ? Mitt. Ent. 1939 14

INDEX

| | | | |
|--------------------|-----|-----------------------|----|
| albicans Schnaid. | | nigra Closs. | 2. |
| alexandra Hemm. | 1. | | |
| | | obscura Tutt. | 2. |
| clara Tutt. | 1. | obsoleta Tutt. | 1. |
| contrastata Lpke. | 2. | opposita Tutt. | 2. |
| esperii Vty. | 1. | pallida Froh. | 1. |
| extensa Tutt. | 2. | pallida Mosl. | 1. |
| | | pallidepunctata Lpke. | 2. |
| | | paupera Tutt. | 1. |
| (faunus Trti. | 2.) | pseudoesperii Tacc. | 1. |
| fuscus Froh. | 2. | | |
| | | septentrionalis Vty. | 1. |
| grisea Lpke. | 2. | striata Lpke. | 2. |
| infraflava Vty. | 2. | | |
| infranigrans Vty. | 3. | | |
| infraochracea Vty. | 2. | | |
| infraviridis Vty. | 3. | | |
| intermedia Froh. | 1. | | |
| juncta Tutt. | 2. | | |

venata Bremer & Grey. Motschulsky Et. Ent. 1852. 1. p. 61.
 = sylvanus Esper. (prim. homonym Drury) Eur. Schmett. 1777. 1. pl. 36. f. 1.

aberrational forms etc.

venata

subsp. alexandra Hemming. (nom. nov. pro. sylvanus Esp.) Stylops. 1934 (15 May) 3. p. 99.
 = esperi Verity. (nom. nov. pro Sylvanus Esp. (Ent. Rec. 1934. 46. (21 May) Suppl. p. 13).
 The subspecies from Europe, excluding Northern Europe. This does not concern British populations, which are subsp. septentrionalis Verity. (see next form).

venata

subsp. septentrionalis Verity. Ent. Rec. 1919. 31. p. 28.

The more Northern races such as the English one, tend to melanism and have a very distinct look. I suggest the English race should be called septentrionalis. Some authors have erected the name faunus Turati, described as a species, for this race, with the argument that it was the first name given to a specimen of the northern form. It was from Switzerland and does not come under Verity's zone at all.

ab. pallida Mosley. Nat. Journ. 1896. Suppl. p. 18.
 = pallida Frohawk. Vars. Brit. Butts. 1938. p. 196.
 The ground colour yellowish-bone.
 Frohawk's was whitish.

ab. intermedia Frohawk. Vars. Brit. Butts. 1938. p. 196.
 The ground colour straw-yellow.

ab. paupera Tutt. Brit. Lep. 1906. 8. p. 134.
 The ground colour pallid, scaling poor, the dark areas tending to albinism and the spots more bleached than usual, giving the impression of pallid uniform colouring.

ab. pseudoesperi Taccani. Boll. Soc. Ent. It. 1949. 79. p. 6.
 Specimens with a lighter and more extensive yellow ground colour than our generally darker population subsp. septentrionalis Verity and therefore similar in appearance to subsp. esperi Verity from Southern Europe.

ab. clara Tutt. Brit. Lep. 1906. 8. p. 135.
 Bright fulvous, the marginal areas particularly dark, the forewings with a narrow black marginal line. The hindwings more broadly black-margined, the pale spots full coloured, bright but contrasting with the ground colour.
 It is difficult to know what Tutt meant by "the marginal areas particularly dark" when he says that the forewing only have a narrow black marginal line.

ab. obsoleta Tutt. Brit. Lep. 1906. 8. p. 134.
 Uniform fulvous-brown to the outer marginal areas which are darker. The usual pale spots almost or quite obsolete.

♀ *ab. obscura* Tutt. Brit. Lep. 1906. 8. p. 134.

= *nigra* Closs. Int. Ent. Z. 1914. 8. p. 72.

= *fuscus* Frohawk. Vars. Brit. Butts. 1938. p. 196. pl. 47. f. 4.

Intense dark brown, the spots small and distinct.

Closs's *nigra* was much darker than the type on both upper and underside. Blackish-brown with a few small spots or yellow cheques on fore and hindwings.

Frohawk's *fuscus* had all wings deep brown with the markings only just discernible.

ab. opposita Tutt. Brit. Lep. 1906. 8. p. 134.

The pale spots contrasting strongly with the ground colour which is strongly mixed with fulvous, the darker tint conspicuously present at the base as well as in the marginal areas. Underside usually fairly marked with the upperside design.

ab. pallidepunctata Lempke. Tijdschr. Ent. 1953. 96. p. 260.

The ground colour as dark as in *ab. opposita* Tutt but the spots pale yellow-brown to yellow-white.

ab. contrasta Lempke. Tijdschr. Ent. 1953. 96. p. 261.

Ground colour of the upperside black-brown, the spots normal as regards colour and size, sharply contrasting.

ab. grisea Lempke. Tijdschr. Ent. 1953. 96. p. 260.

The ground colour of the upperside of the wings greyish with strongly contrasting narrow black border, the spots yellow-brown sharply contrasting.

ab. extensa Tutt. Brit. Lep. 1906. 8. p. 135.

The pale spots of both fore and hindwings united with the discal spots and continued to the base as a pale blotch, leaving a dark outer margin.

ab. faunus Turati Nat. Sic. 1905. 18. p. 36. pl. 6. f. 5.

Raised to the rank of subspecies from Switzerland and no longer included in these lists as an aberration.

ab. striata Lempke. Tijdschr. Ent. 1953. 96. p. 261.

The pale spots of the upper and underside of the hindwings extended in the shape of stripes.

ab. juncta Tutt. Brit. Lep. 1906. 8. p. 134.

On the underside of the hindwings the disc is pale owing to the confluence of all the small spots into a single large one.

ab. infraflava Verity. Boll. Lab. Zool. Portici 1920. 14. p. 45.

The underside uniformly light or bright yellow, without the quadrangular spaces.

ab. infraochracea Verity. Boll. Lab. Zool. Portici 1920. 14. p. 45.

The underside of a reddish tint, the yellow quadrangular spaces still showing.

ab.infranigrans Verity. Boll.Lab.Zool.Portici 1920.14.p.45.

The underside covered with a sprinkling of black scales, the yellow quadrangular spaces still visible but less than normal.

ab.infraviridis Verity. Farf.Diurn.It.1940.1.p.109.pl.4.f.53.

The underside of a beautiful vivid green.

